U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

HRP-0900277

Health Manpower Planning and Linkage System - Dental Component of the Health Manpower Plan

South Dakota Dept of Health, Pierre

Prepared for

Environmental Protection Agency, Denver, CO Region VIII

Apr 78

HRP-0900277

Health Manpower Planning and Linkage System

DENTAL COMPONENT OF THE HEALTH MANPOWER PLAN

linkage

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U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

This report and the efforts upon which it was based was supported in part and performed pursuant to Contract No. 298-74-C-001 between the U.S. Public Health Service, Denver, Colorado and the South Dakota Department of Health. Conclusions and opinions expressed herein do not necessarily represent the views of these two agencies.

IT MUST BE STATED AT THIS TIME THAT THIS REPORT INCLUDING THE PRIORITY RANKING OF RECOMMENDATIONS ARE ONLY FOR THE FIELD OF DENTISTRY. UNTIL ALL HEALTH MANPOWER NEEDS HAVE BEEN THOROUGHLY ASSESSED, THERE IS NO WAY OF KNOWING WHERE THE DENTAL NEEDS RANK IN RELATION TO THE OVERALL NEEDS OF SOUTH DAKOTA. WHEN THE NURSING, PHYSICIAN AND ASSOCIATED HEALTH COMMITTEES HAVE COMPLETED THEIR WORK, ALL FOUR AREAS WILL BE COMBINED BY THE EXECUTIVE COMMITTEE INTO A SINGLE HEALTH MANPOWER PLAN FOR SOUTH DAKOTA.

Number of Copies Printed 400

Published as Planning Document

DOCUMENT INFORMATION SHEET

REPORT NUMBER
HRP-0900277

TITLE
Health Manpower Planning and Linkage System -- Dental Component of the Health Manpower Plan.

REPORT DATE
Apr 78

PERFORMING ORGANIZATION, NUMBER & NAME
South Dakota Dept. of Health, Pierre.

CONTRACT-GRANT NUMBER
PHS-HRD-298-74-C-0001

SPONSORING ORGANIZATION
Public Health Service, Denver, CO. Region VIII.

AVAILABILITY
UNLIMITED

PAGES 89

PRICE
PC$ A05

MF$ A01

HEALTH MANPOWER PLANNING AND LINKAGE SYSTEM

DENTAL COMPONENT OF THE

HEALTH MANPOWER PLAN

A Cooperative Project of the South Dakota Department of Health
South Dakota Health Systems Agency
and the
U.S. Public Health Service
Division of Health Resource Development, Denver

Produced in Compliance with
Contract No. 298-74-C-0001

For Further Information Write or Call:
Room 123A, Joe Foss Building
Pierre, South Dakota 57501
605-773-3757

April 1978

PREFACE

The South Dakota Health Manpower Planning and Linkage System is designed as a process for planning and cooperation between health organizations, agencies, providers, and consumers of health. As it has developed, the "Linkage Concept" is a planning process which has at its heart the cooperation and relationship between people as individuals, providers of services, and as social beings with a commitment to the public. The preparation of this plan was made possible under Contract No. 298-74-C-0001 from the Division of Health Resources Development, Public Health Services, DHEW, Denver to the South Dakota State Department of Health.

One of the chief, specific objectives of the Dental Subcommittee of the Linkage Project has been to develop this planning document. This dental planning document is designed to provide background information and data, assessments, projections, and recommendations for dental manpower in South Dakota. The assessments are made to provide a thorough and careful analysis of the availability and adequacy of dental manpower in our State. The projections aim at determining the paths to the future and impact of strategies to effect change. Finally, the recommendations urge the individual and group endeavors identified to assure that the future of South Dakota includes the quantity and quality of dental care adequate to the attainment of the good oral health.

The Dental Component is one of four being prepared for incorporation into a single Health Manpower Plan. Other plans will cover nursing manpower, physician manpower including auxiliaries, and associated health manpower.

Plan development for dental manpower was the second area to be begun by the "Linkage System." It is in accord with the ten-step process developed for the total plan. An outline of these ten steps is described on the next page for the purpose of continuity and as a conceptual framework.

It is important to understand the history of dental manpower planning in South Dakota. For many years, South Dakota has had fewer dentists per population than most states. By the late 1960's, most agreed that the dental manpower situation had approached a critical stage. Dentists were dying, retiring or leaving the State at a greater rate than new dentists were coming to South Dakota. Other dentists were near or at retirement age. For example, Huron had 70% (7 out of 10) dentists who were near or at retirement age. South Dakota had no dental school and few South Dakota students were being admitted to dental schools.

The South Dakota Dental Association Secretary, William Dunn[1], reports that prior to 1970:

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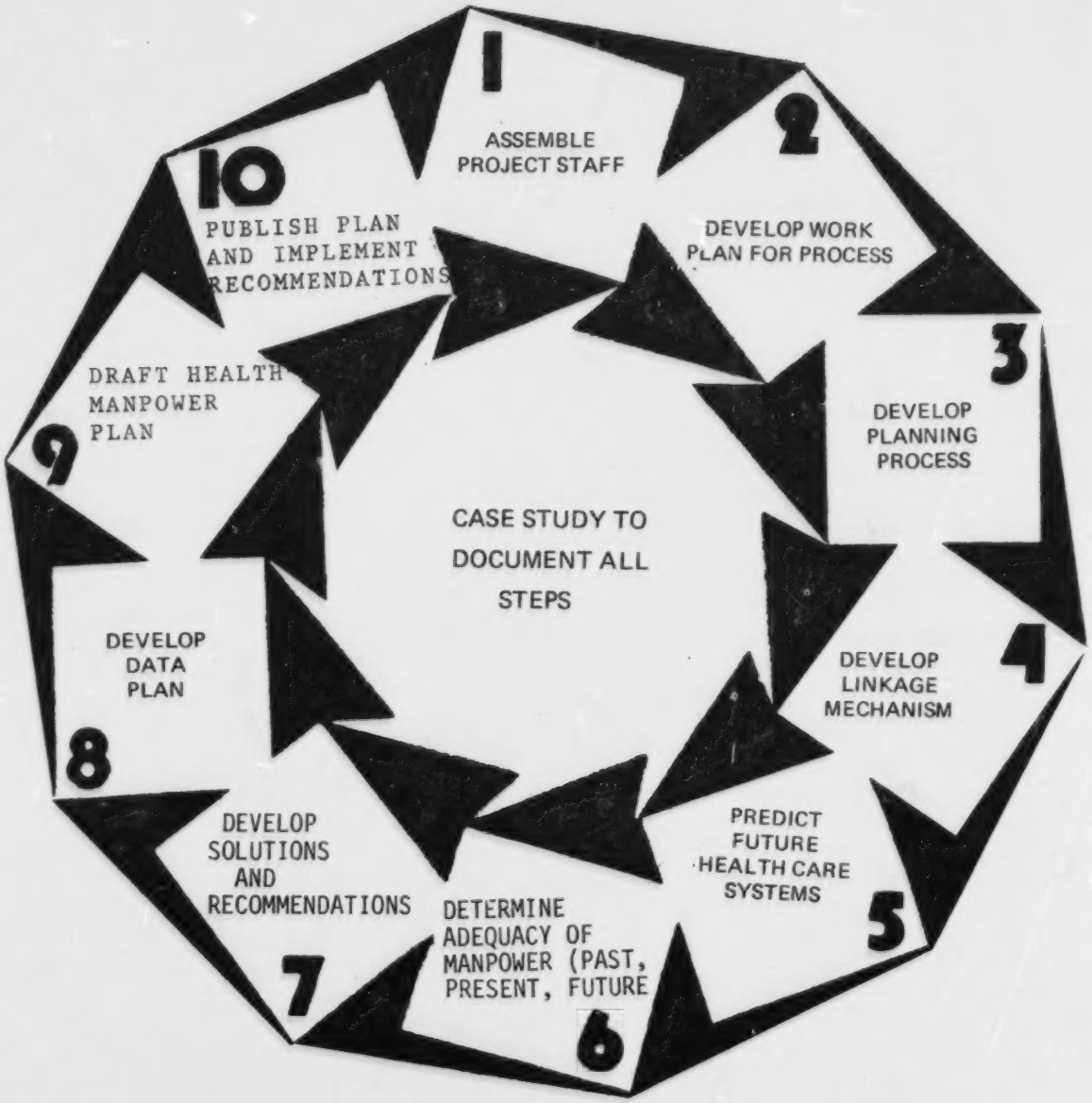
[1]William E. Dunn, Dentistry In South Dakota 1976, South Dakota Dental Association, December 31, 1976.

Health Manpower Planning Process



April, 1978

DENTAL PLAN

Key Points Summary

1. Process used involved many people; it was a comprehensive study by a mix of different types of people.

2. Most dental manpower needs in South Dakota are met.

3. Ninety-one percent of the current demand and 127% of current critical need for dentists in South Dakota is met; by 1990, projections are that these two percents will be 98% and 140%, respectively.

4. Programs created in the late 1960's and early 1970's have been successful in increasing South Dakota's number of dentists and therefore public dollars can now be reduced for supporting these programs.

5. The majority of South Dakota dentists give indications that they are not overworked.

6. South Dakota dentists have a sufficient number of dental auxiliaries and use about the same number of auxiliaries as the average United States dentist.

7. In South Dakota there is a lower utilization of dentists by the population than in the United States.

8. South Dakota ranks 15th of all states in fluoridation levels with 61% of the population having fluoridated water.

9. South Dakota is presently having a yearly net gain in number of dentists.

10. Although the aggregate supply of dentists is adequate, the Plan lists five trade areas (18 counties) where the immediate access to dentists is difficult.

11. Twenty recommendations were made.

More information can be obtained by writing the Linkage Project, Joe Foss Building, Pierre, South Dakota 57501 or calling (605) 773-3757.

"The teeth of the children were in appalling condition. It was an everyday experience for a dentist to see several children three years of age or less with ten to twelve badly decayed teeth. A citywide survey of second graders in Sioux Falls in the late fifties showed the children's teeth to be among the worst in the entire nation."

The situation called for action. In 1966, the cooperative efforts of the South Dakota Dental Association including its Council on Dental Health, the State Department of Health through its dental director Dr. Carman Sutley, the State Legislature and the federal government, resulted in the development of legislation to create a School of Dental Hygiene, a School of Dental Assisting, and a School of Dental Laboratory Technology.

In 1969, the cooperative efforts produced more action. As a result, the South Dakota Legislature passed two important pieces of legislation. First, they expanded the Health Professions Loan Fund to include dentistry. Second, the legislature passed SDCL 34-24a-1 requiring fluoridation of municipal water supplies in all communities over 500 population. In 1970 the controlled fluoridation law was referred to a direct vote of the people, and the South Dakota electorate voted in favor of that fluoridation law. This was the first time controlled fluoridation became law for an entire state by direct vote of the people.

In 1970, the South Dakota Legislature passed SDCL 13-49-20.1 contracting with out-of-state dental schools to reserve spaces for South Dakota students to study dentistry.

During the early 70's some South Dakota dental students received loans from the federal government and forgiveness of the loans if they located in shortage areas (most of South Dakota). The National Health Service Corp (NHSC) also placed federally supported dentists in five South Dakota communities. There has been a lot of turnover in the NHSC dentists, none have been fully busy and all offices are losing money, making it unlikely that these will become private practices in the future.

In 1972, South Dakota became part of an eleven state testing service for dental graduates. The other states included are: North Dakota, Minnesota, Iowa, Nebraska, Colorado, Wyoming, Oklahoma, Missouri, Kansas and Wisconsin. This has provided a large pool of dentists who could be licensed in South Dakota by meeting a few additional requirements. There were thirteen regional tests during 1976 and approximately 1,300 dentists passed those examinations and are therefore eligible to practice in South Dakota.

In 1974, the South Dakota Dental Association (SDDA) signed a contract with the State Department of Health to recruit dentists to practice in South Dakota. The Council on Dental Health and Dr. Sutley of the State Department of Health have administered this program. Since 1974, recruiting trips have been made to area dental schools and a contract has been signed with the University of Minnesota to provide computer placement services.

By 1976, the results of these programs were being noticed. For the first time in years, more dentists were coming into the State than were leaving. The teeth of children showed substantial improvement. However, good figures and methods were not available to completely assess the effect of these programs and then predict the future needs for such programs. It, therefore, seemed appropriate that the Health Manpower Planning and Linkage Project do a detailed study of dental manpower. In June 1976, such a study was begun by the forming of the Dental Subcommittee. This document is the product of that effort.

Summary for Linkage Task Force Members April, 1978

SOUTH DAKOTA DENTAL PLAN AVAILABLE FOR RELEASE

By the late 1960s, most agreed that the dental manpower situation had approached a critical state. The situation called for action. From 1966 to 1976 many new programs were created through the cooperative effort of the South Dakota Dental Association including its Council on Dental Health, the State Department of Health through its dental director Dr. Carman Sutley, the State Legislature and the federal government. Schools of Dental Hygiene, Dental Assisting and Dental Laboratory Technology were created; the Health Professions Loan Fund was expanded to include dentists; State legislation was passed requiring fluoridation of municipal water supplies in all communities over 500 population; contracts were signed with out-of-state dental schools to reserve space for South Dakota students; five communities obtained National Health Service Corps dentists; South Dakota became a member of an eleven state testing service for dental graduates; and an active recruitment and placement service was developed.

By 1976, the results of these programs were being noticed. However, good figures and methods were not available to assess the effect of the programs and predict future needs for programs. It, therefore, seemed appropriate that the Health Manpower Planning and Linkage System do a detailed study of dental manpower. In June 1976, such a study was begun by the forming of the Dental Subcommittee. The product of their effort, the Dental Component of the Health Manpower Plan, has now been approved by the Executive Committee for release and distribution.

A unique process was used to produce the Plan. Uniqueness results from the involvement of people, the planning steps and methods used, the Plan's completeness, and its structure. The people involved are from a variety of backgrounds representing the entire State geographically. These individuals gave generously of their time so that hard data could become real when expressed in the methods and recommendations. The Plan can serve as a guide to help direct those who must meet the dental manpower needs of the State as they are faced by local governments, Planning Districts, State and Federal government bodies. This Plan is but one of four to be produced and phased into a single comprehensive manpower plan for the State. The other plans being developed are the Physician, Nursing and Associated Health.

Very early in its deliberations the Dental Subcommittee decided that a thorough study was needed. They chose to prepare detailed methods of analysis and to involve as many persons as possible. One of the key decisions was to use a basic utilization model to estimate demand for dental care. Considerable time was spent in discussing how to estimate utilization, demand and productivity. Factoring in fluoridation, use of prepayment plans, age of dentist, auxiliary utilization, income of the population and other factors were also discussed thoroughly. Dental trade areas were also developed. Throughout its discussion, the Subcommittee emphasized prevention. It also examined dental auxiliaries, the Compact Program, Title 19 usage, recruitment, vocational education of dental auxiliaries, and continuing education. The Subcommittee developed a list of

shortage areas for use by government programs. Finally, it created recommendations and based on a benefit/cost analysis, gave each a priority of top, medium or low

The background data in the Plan gives an indication of the dental situation in South Dakota. A method of assessing the adequacy of dentists was developed using this background information and other pertinent data. This assessment shows that 127% of South Dakota's Critical Needs are currently met and the critical needs will exceed 140% by 1990. In addition, 91% of Current Demand is met. Projections also, forecast that by 1990, South Dakota's demand will be 98% met. The basic conclusion of these assessments is that the programs created in the late 1960's and early 1970's have been successful in improving South Dakota's number of dentists and therefore public dollars can now be reduced for supporting these programs. The Dental Subcommittee therefore recommended that:

> "In light of apparent trends towards supply and demand equilibrium and because critical needs are met in South Dakota, a reduction in the South Dakota Dental Compact Program be made with a review and on-going evaluation. This recommendation is made from a purely manpower standpoint; the Subcommittee, however feels that anybody considering action on this resolution should seriously balance this consideration with the loss of an excellent educational opportunity for South Dakota students."

Although the aggregate supply of dentists in South Dakota is adequate relative to the needs and demand of the population, the Plan lists five dental trade areas (18 counties) where immediate access to dentists is difficult. Four recommendations addressed this maldistribution of dentists. They recommended: 1) that federal programs use the shortage area designations developed in the Plan; 2) differential loan forgiveness rates be offered by the State to help place dentists in shortage areas; 3) the Plan be exclusively used to designate the counties eligible for National Health Service Corps dentists; and 4) the present placement service be continued and streamlined.

In regard to auxiliary workforce, the Plan recommends that the number of graduates from the Dental Assisting, Dental Laboratory Technology, and Dental Hygienist programs in the State should be maintained.

In the area of prevention, six recommendations were made. They encouraged: 1) the conversion of food machines in schools from cokes and candies to milk and fruit; 2) endorsed a demonstration project to set up a system of preventive programs for institutionalized and homebound individuals and a system to screen and care for the same; 3) endorsed a small scale demonstration project to study the benefits of dental health education as part of the school curriculum; 4) recommended that fluoridation be expanded to include all organized water systems; and 5) urged the periodic preparation of a report to insure adequate fluoridation levels.

Five recommendations were made concerning data collection. The development of more accurate trade areas, the conducting of a survey of dental practice every three years, the maintenance of a minimum data set on dentists, the development of a methodology for assessing the adequacy of dental auxiliaries, and the development of a methodology relating dental manpower to dental health status were recommended.

Finally, there were three recommendations of a miscellaneous nature made. They were: 1) that continuing education requirements for dentists be raised to 75 hours over a three year period; 2) that peer review of dentists be endorsed; and 3) that a full-time Dental Director be hired by the State to coordinate dental activities by the Department of Health.

The Dental Plan was developed under a contract from the federal government to the State Department of Health. It is a cooperative project of these two agencies plus the Health Systems Agency. More information can be obtained by contacting the Linkage Office, Room 123A, Joe Foss Building, Pierre, South Dakota 57501, (605) 773-3757.

ACKNOWLEDGMENTS

The Dental Component of the Health Manpower Plan is the cooperative effort of many persons working collectively as individuals and as teams. These people represent professional organizations, public and private health institutions, government agencies, educational facilities, as well as themselves. It is fitting that these persons and organizations be recognized for their contributions in the development of this Plan because it is their Dental Plan.

DENTAL SUBCOMMITTEE

Name	Location	Representing
Richard R. Baker	Aberdeen	Dentist, Indian Health Service
Ron Carlson	Sioux Falls	South Dakota Dental Laboratory Association
Mary J. Daniels Max Johnson*	Watertown	Lake Area Voc-Tech School, Dental Assistant and Dental Lab Programs
Mary Lynn Meyers Mary Sue Donohue*	Pierre	Division of Human Rights Dept. of Commerce and Consumer Affairs
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Deloris McDonald	Sioux Falls	Southeast Area Voc-Tech School
Jim Nyberg Paul M. Torgerson**	Yankton Rapid City	Practicing Dentist Dental Licensure Board
Fritz Olsen	Belle Fourche	Consumer Representative

*Replacement
**Alternate

Name	Location	Representing
Dennis Potter	Pierre	Planning & Development District V
Paul Reinke Chairman	Rapid City	Dentist, South Dakota Dental Association

Recognition is in order for the staff who have written and critiqued the Plan and other staff who have provided their insight, technical expertise, and assistance.

B. Jerald McClendon, Linkage Project Coordinator. Key staff person for the Dental Subcommittee; drafted most of the text; developed some of the methods; conducted survey of dentists.

Dave Christensen, Linkage Staff. Provided technical direction towards the end of the process; completed the necessary computer runs and tabulations.

Sherm Folland, Health Economist, formerly of the Linkage staff, now with the South Dakota Health Systems Agency. Developed some of the early technical methods; provided technical consultation during the early development of the Plan.

Mary Wilcox, Planner, Linkage staff.

Bernie Osberg, State Health Planning and Development Agency.

Robert Hunt, Health Systems Agency. Contributed many services to the project including design of logo.

Donald G. Brekke, Linkage Project Director.

Sister Mary Schneider, Coordinator of Linkage Subcommittees.

Wayne Gildseth, Augustana College

We wish to recognize the Technical Methods Subcommittee for their guidance in the development of the methodologies. The members on this Subcommittee reflect the combined expertise of statisticians, economists, computer scientists, manpower specialists and educators.

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We thank the Executive Committee for their practical guidance and approval.

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Ed DeAntoni	Pierre	Secretary of Health (Formerly of Health Planning Program, SHPDA)
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Anton Schwab Mrs. Anton Schwab*	Andover	Consumer Representative

*Alternate

Name	Location	Representing
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Gerald Tracy Woody (Durward) Lang**	Watertown Sioux Falls	South Dakota State Medical Association
Cathy Wernke Ruth Vandin Bosch*	Gregory	Consumer Representative

*Alternate
**Due to Dr. Tracy's illness, Durward Lang was selected to replace him beginning in 1977.

Thanks also go to several other persons, organizations, and institutions who have contributed in a variety of ways to the Dental Component of the Health Manpower Plan.

Walt Ackerman, Dentist, Rapid City

Judith Call, former Secretary of Health

Dick Blair, Deputy Secretary of Health

Don Kurvink, Director--State Health Planning and Development Agency

Mike Liebman, Project Officer--DHEW, Region VIII

Gunnar Sydow, Dentist, DHEW, Region VIII

John Elliot, Dentist, Dental Consultant--DHEW, Region VIII

Carman Sutley, Dentist, Dental Division, State Department of Health

Mike Shaw, Administrative Director--South Dakota Dental Association

Bill Dunn, Dentist, Secretary--South Dakota Dental Association

Ed Whillock, Peridontist, Rapid City

Charles Richter, Dentist, Huron

Council on Dental Health, South Dakota Dental Association

South Dakota Dentists, Assistants, Hygienists, and Laboratory Technicians

Division of Dental Health, DHEW, Bethesda, Maryland

American Dental Association, Chicago, Illinois

American Dental Hygienists Association, Chicago, Illinois

Finally, our thanks go to Ms. Caroline Burtts for coordinating the preparation of this document and to Ms. Diane Plautz and Ms. Sylvia Mefford for providing the essential clerical operations associated with the plan. Without their dedicated efforts, this product would not have been possible.

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Chapter I. CONCEPTUALIZATION OF LINKAGE

A. General Discussion

The Health Manpower Planning and Linkage Project had defined "Linkage" as "the relationship between two persons, two functions, or between a person and a function." This definition concerns relationships which directly or indirectly relate to the current health manpower planning, decision-making, and resource-allocation processes within the State (in this instance, as it relates to dentistry).

A "Linkage System" is the sum of all the individual linkages. Consequently there are many ways in which a "Linkage System" can be formed. The way in which the "Linkage System" is formed is called the "Linkage Mechanism." The "Linkage Mechanism" for the South Dakota Health Manpower Planning and Linkage System is the formally constituted Task Force and its committees. Each member on the Task Force serves on one or more of the seven committees. Each committee except the Implementation Subcommittee selected additional individuals who are not members of the Task Force to serve on the committee. This flexibility opens up the process to allow for further linkages (professional, economic, social, or political expertise) and a balanced geographic distribution of persons.

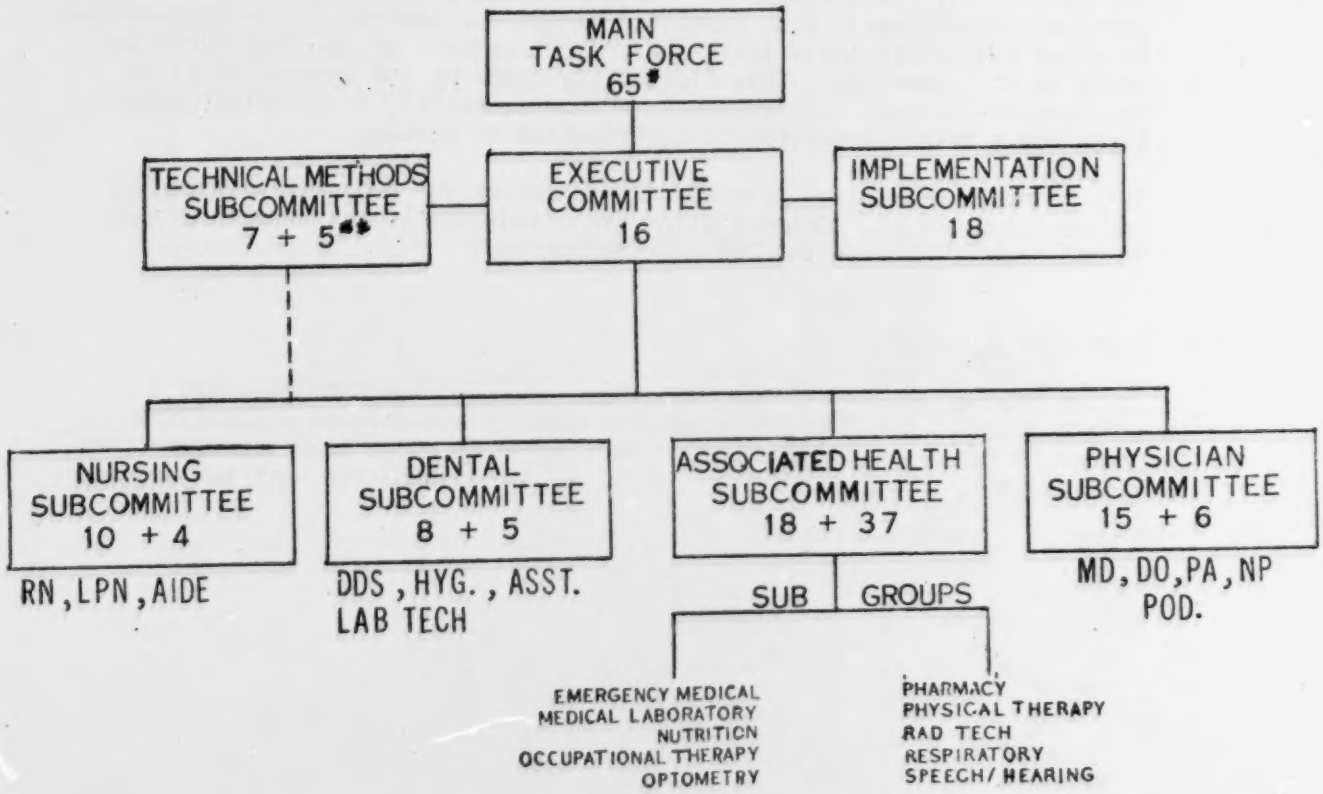
This "Linkage Mechanism" provides the framework for cooperative planning and decision making. Communication among individuals and between groups is facilitated through the "Linkage Mechanism."

B. Committee Structure

At the initial meeting of the Task Force an Executive Committee was selected. Subsequently, the Executive Committee developed a committee structure for preparing the Health Manpower Plan. The committee structure and the basic functions of each committee is given on the next two pages.

linkage

COMMITTEE STRUCTURE



* MEMBERS

** NON TASK FORCE
PERSONS ADDED

122 PERSONS

1/17/78

BASIC FUNCTIONS OF COMMITTEES

Introduction

The committees are representative of the Task Force having on them members who are consumers, planners, providers, and government officials. A balanced geographical mix is also desirable for each committee. Their functions are outlined below. These functions are the responsiblity of the Task Force and have been delegated to committees so they can be accomplished with flexibility. The Executive Committee, representative of the Task Force, acts in place of the Task Force to see that the respective subcommittees accomplish their functions.

Executive Committee - This body was elected by the Task Force and represents the 65-member Task Force in the following functions:

- -work with project staff in operation of project
- -responsible for subcommittee structure, membership and report in conjunction with project staff
- -policy and decision making for Health Manpower Plan
- -drafting Health Manpower Plan
- -project philosophy

Implementation Subcommittee - Advisory to the Executive Committee with these responsibilities:

- -distribution and use of Health Manpower Plan
- -publicity of project
- -cooperation among groups/individuals
- -implementation of process

Technical Methods Subcommittee - Advisory to the Executive Committee with these responsibilities:

- -review and comment on all technical aspects of Nursing, Physician, Dental, and Associated Subcommittees
- -planning methods development
- -develop data plan
- -coordinate all data collection

Nursing Subcommittee

- -draft nursing portion of Health Manpower Plan

Physician Subcommittee

-draft Physician, Osteopath, Podiatrist, Physician Assistant, and Nurse Practitioner portions of Health Manpower Plan

Dental Subcommittee

-draft Dentist, Dental Hygienist, Dental Assistant, and Dental Laboratory Technician portions of Health Manpower Plan

Associated Health Subcommittee

-draft Health Manpower Plan for manpower in the following areas: Emergency Medical Services, Medical Laboratory, Nutrition, Occupational Therapy, Optometry, Pharmacy, Physical Therapy, Radiologic Technology, Respiratory Therapy, Speech and Hearing
-additional areas in future cycles

Note: Each committee, except the Implementation Subcommittee, has additional members who are not on the main Task Force. These individuals are able to add additional expertise to the committee and thus help the committee to better accomplish its functions.

Chapter II. DENTAL SUBCOMMITTEE

A. Introduction

The Dental Subcommittee was formed in June, 1976 after an assessment of what persons, groups, and organizations had an interest in dental manpower from the perspective of resource development and allocation (see the List of Acknowledgments for the membership). The membership, which was approved by the Executive Committee, includes a good mixture of dental providers, consumers, government officials and educators.

The Subcommittee and staff have given hours of time in developing and in writing this Dental Manpower Plan for South Dakota. They have produced a plan which is based on objective data and methods as well as the knowledgeable experience of a state and its human condition.

As is the case with many subcommittees, people change, attendance will vary, and new individuals will replace them on the subcommittee. However the turnover in membership of the Dental Subcommittee was considerable and did cause some problems. Because all past activities have been recorded in detail and are on file, these can serve to bring a new member, unfamiliar with past activities, up-to-date and to document attendance, decisions, and discussions.

In summary, the Dental Subcommittee and staff are a mechanism for present and future dental manpower planning for South Dakota. Each person was asked to share his knowledge and experience as an individual, as members of specific groups, organizations, institutions, and geographic areas of the State to provide guidance for decisions affecting dental manpower and ultimately the dental health of the public.

B. Subcommittee Process

An informal method of group process was selected by the Subcommittee at its initial meeting. This process is based on some of the principles set forth by Carl Rogers in his book on encounter groups. These were adapted for the purposes of this Subcommittee as follows:

1. Each person is integral to the "Linkage Project."

2. The project is owned by the people of South Dakota. The staff are facilitators of the process; namely, the task at hand, cooperative efforts, objectivity, data, and methods and ultimately the Dental Manpower Plan.

3. A goal of the Subcommittee is to build relationships between persons, persons and functions, and between functions.

4. The quality and degree (depth) of success is built on participation.

5. The developments and/or activites of this Subcommittee are cooperatively owned. Each person is responsible for providing input, asking questions, stating realities as they are from his/her individual perspective and knowledge base.

Integral to the process was the opportunity for each person to come to know each other as a person. Time was allowed for each individual to air ideas and the group the opportunity to reflect on them before making a decision. The evaluations conducted after one of the meetings showed that this was not always accomplished.

Different points of view were shared and weighed before making a decision. A total consensus was not always possible even after a discussion of the issue and time to reflect on the different perspectives. However, this was the exception, as most of the time a consensus was reached. All adopted motions were passed with a 2/3 vote or more.

In many ways the meetings of this Subcommittee were an opportunity for sharing expertise and for learning new ideas. This was partly due to the fact that only a small number of dental auxiliaries and consumers actually came to a majority of the meetings. The dentists tended to be the dominant influence in the meetings. However, the Technical Methods Subcommittee and the Executive Committee looked closely at the results and asked for changes in order to give a more balanced perspective.

All materials developed by the Subcommittee were sent to the Council on Dental Health of the South Dakota Dental Association (SDDA). There was active involvement of several members of SDDA as well.

It was the opinion of staff that the behavioral process by which the Subcommittee achieved its reports was conducive to the development of a plan based on objective methods and supported by personal knowledge of South Dakota people. This process, however, at times had to confront differing views between committee aspirations and desires and needs of some committee members.

Future updates of this plan should include more time for the study of methods by the Subcommittee, more continuous membership and emphasize evaluation of the plan development process.

C. Philosophy

The purpose of a philosophy is to provide direction and a focus for the methodologies, assessments, projections, and finally, the recommendations which are made. The philosophy also forms a framework for past, present, and future discussions on dental manpower.

The Dental Subcommittee affirmed a philosophy at the beginning of its work as follows:

> "Recognizing the effect of dental health on the social, pscyhological, and physical parameters of an individual's life, we define optimal dental health care more precisely as the prevention, cure, or amelioration of any oral condition which adversely affects the development of full life attainment and which is within the capabilities of the dental profession. We further consider preventive measures as important as actual treatment in evaluating and improving the dental health of the State (i.e. prevention is essential).
>
> Furthermore, this Subcommittee supports the concept that whenever possible the resources of the private health care sector should be used to provide good dental health for the people of South Dakota. Where this is not feasible, the public resource which least interferes with the free market system and yet provides the necessary services should be given priority."

D. Summary of Meetings of the Dental Subcommittee

The Dental Subcommittee was organized on June 19, 1976. Subsequently, over the next 20 months the Subcommittee was convened 6 additional times. Additional mailings were used to conduct business as an alternative to a meeting.

The process for each meeting included written material mailed in advance. The enclosures with these mailings included an agenda, minutes of the previous meeting and staff work requested by the Subcommittee. The minutes were prepared as a detailed account to serve as a historical record of the Subcommittee's activities. The minutes and all other enclosures are on file in the Health Manpower Linkage Office in Pierre for anyone who should choose to request a copy or wish to review them. (A summary is listed in Appendix 2.)

The meetings of the Dental Subcommittee created communication about dental manpower throughout the State. It is impossible to record or even to describe in detail this process. The next few paragraphs will highlight the process. Appendices 2 and 3 provide additional information on the meetings, the topics discussed and the mailings.

Very early in its deliberations the Subcommittee decided that a thorough study was needed. They chose not to take the easy route, but to prepare detailed methods of analysis and involve as many persons as possible.

One of the key decisions was to use a basic utilization model to estimate demand for dental care. Considerable time was spent in discussing how to estimate utilization, demand and productivity. How to factor in

fluoridation, use of prepayment plans, age of dentist, auxiliary utilization, income of the population and other factors were discussed thoroughly.

Early in its deliberations the Subcommittee developed dental trade areas to use as the unit of analysis rather than counties or planning districts. These are shown in Appendix 1.

Throughout its discussions, the Subcommittee emphasized prevention. It also chose to study dental auxiliaries, the Compact Program, Title 19 usage, recruitment, vocational education of dental auxiliaries, continuing education, and several other related topics. The Subcommittee also developed a list of shortage areas for the purpose of state and federal programs.

Finally, the Subcommittee created recommendations and, based on a benefit/cost analysis, gave each a priority of top, medium, or low.

Chapter III. INTRODUCTION TO DENTISTRY[1]

Dentistry is that branch of the health professions responsible for maintaining and improving the oral health of the public. The practice of dentistry involves the art and science of preventing, diagnosing, and correcting disease and injury to the teeth and supporting oral structures. Other services provided by dentistry include education of the public in proper oral hygiene and nutrition and the early detection of oral cancer as well as basic and applied dental research and various public health activities, such as the fluoridation of community water supplies.

The primary provider of dental care is the dentist. Assisting the dentist and, in actual effect, extending the dentist's own productive capacity are three categories of dental auxiliaries: dental hygienists, dental assistants, and dental laboratory technicians.

Public demand for dental care is increasing as the population expands, as standards of living and of education rise, and as private and public mechanisms for providing payment for dental services becomes more widely available and accepted. In order to meet the existing demand for dental care, as well as anticipated future needs and demands, the dental team has increased its capacity to provide dental services. This effort has taken primarily the form of training both more dentists and more dental auxiliaries. A further measure is an ongoing re-examination of the traditional roles of the dentist and the dental auxiliaries, so that the dental team can be more responsive to variations in the public's demand for dental services. A major result has been the expansion of the range of tasks and functions delegated to auxiliaries. This, in turn, has brought about programs for educating both dental students and practicing dentists in the effective management and utilization of auxiliaries. At the present time, the dental profession is widely regarded as being in a period of major transition, with dental practices ranging from the solo dentist, with limited chairside help from one receptionist-assistant who has been trained on-the-job, to new types of practices, both solo and group, with highly trained auxiliaries as an integral part of new kinds of dental teams.

As the primary provider of dental care, the dentist has final responsibility for the delivery of all dental services. More than 70 percent of the dentists in the United States are general practitioners in solo private practices, who provide dental care to patients. However, the number of group practices and of clinical-type practices have been increasing. According to a survey conducted by the Bureau of Health Manpower, Health Resources Administration, there were 715 dental group practices in 1970. Dental care services are also provided to eligible recipients in the military services, in hospitals, in public clinics, and in numerous federal and state supported public projects.

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[1] Health Resource Statistics, 1975, DHEW, PUB (HRA) 76-1509, PHS, National Center For Health Statistics, Rockville, Maryland, 1976, pp. 75-98.

Dental education consists of four academic years of professional education in an accredited dental school. A minimum of 2 or more years of undergraduate college education is required prior to admission to a dental school. By 1977 there were 59 dental schools, of these 57 are fully operational, while two are in the development stages. In addition Oral Roberts University will open in 1979. Dentists graduate with either a doctor of dental surgery (D.D.S.) or a doctor of dental medicine (D.M.D.) with the former being the more frequently awarded.

Prior to entering the practice of dentistry in a state or the District of Columbia, all dentists must successfully complete written and clinical examinations. These examinations have traditionally been administered by each state's board of dental examiners (or board of dentistry, or other equivalent). Within recent years, an increasing number of licensure applicants have taken the national written examination of the National Board of Dental Examiners. Forty-nine states now accept this national board examination in lieu of the state's own written examination. An increasing proportion of licensure applicants now also take clinical examination administered by regional testing agencies, accepted by participating states in lieu of their own clinical examinations. In 1973, there were 3 such regional testing agencies, involving 28 states. In the other 22 states, the clinical skills of licensure applicants are examined by the individual state boards. Recent changes in some state dental laws now also require dentists and dental hygienists to continually upgrade their proficiency by attendance at formal continuing education courses and other activities.

In each state, dental hygienists are the only dental auxiliaries who, like dentists, are required to obtain a license to practice. The hygienist, working under the direction of a dentist, performs the tasks of dental prophylaxis (scaling and polishing of the teeth), exposing and processing dental photographs, application of fluorides and other preventive agents to teeth, and instruction of patients in oral hygiene techniques and proper diet. In some states the functions of the hygienist are now being revised and expanded to include a wider range of services.

Dental hygiene education involves either 2 or 4 years of post-secondary education. The training program is conducted at the college or technical school level. The two-year program qualifies a graduate to take both the national board and state licensure examinations which will permit practice in those states. The four-year bachelor's degree program not only qualifies the graduate to take the national board and state examination and to qualify for clinical practice, but also permits the hygienist to apply for teaching and/or administrative positions in schools of dental hygiene and other programs as well as to pursue graduate education.

The dental assistant's primary function is to assist the dentist as he provides treatment services for patients. The assistant's tasks include performing all those functions not requiring the competency of a dentist or

dental hygienist including preparation of the patient, maintaining a clear operating field, passing instruments and materials to the dentist, and the preparation of materials used in the treatment process. Over 30 states, including South Dakota, now permit dental assistants to perform a slightly wider range of services, such as exposing and processing radiographs (X-rays), placing rubber dams, and removing sutures. The functions permitted vary from state to state. In some states, not including South Dakota, even further expansion of the duties of the dental assistant is also being considered, such as taking impressions for study models, prophylaxis of the clinical crowns of teeth, and placement and carving of restorations.

The majority of dental assistants have been trained on the job by their dentist-employers. However, over the past 10 years the number of graduates of formal training programs increased from 695 in 1963 to 5,297 in 1973. This is still only a small portion of all dental assistants. To become accredited by the ADA, a dental assisting program, usually conducted in a community college or vocational-technical school, must provide at least one year of academic training. Some programs offer 2 years of training, adding to the dental assisting curriculum 1 additional year of general education. Dental assistants who have completed accredited educational programs are eligible to take national certification examinations conducted by the Certifying Board of the American Dental Assistants Association.

Continuing education is mandatory to maintain certification. In 1973, there were 14,000 dental assistants with current certifications. The actual number of active dental assistants is not precisely known since most dentists train and employ dental assistants who are neither certified nor registered as members of an official organization. However, the utilization of assistants has progressively increased where today more than 80 percent of the U.S. dentists and more than 90 percent of South Dakota dentists employ at least 1 auxiliary.[2,3]

It is estimated that 118,000 persons were employed as dental assistants in 1973, as compared with some 74,000 in 1960. In 1973, membership of the American Dental Assistants Association numbered 16,000.

Dental laboratory technicians, in response to a written prescription or work order by a dentist, manipulate and shape materials such as acrylics (plastics), ceramics, and metals to construct complete and partial dentures,

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[2]"A Sample Survey of Nonlicensed Dental Personnel Working in Private Clinical Practices: Summary of 1974 South Dakota Results," unpublished data provided by Gerry Joireman, Division of Dentistry, BHM, HRA, PHS, DHEW, Bethesda, Maryland, 1977.

[3]The 1977 SDDA Survey of Dentists: A Linkage Report, South Dakota Dental Association and South Dakota Health Department, Health Manpower Linkage Project, Pierre, South Dakota, November, 1977, p. 9.

crowns, bridges, and orthodontic devices. These tasks require the use of precision instruments, casting machines, furnaces, and other special equipment. Most dental technicians work in commercial dental laboratories. However, increasing numbers are employed by private dental practitioners and by federal, state, and private institutions.

Traditionally, dental laboratory technicians have been trained on the job, but the predominant method of training is now through formal programs. Since 1951, the American Dental Association has accredited an increasing number of dental technology programs offered by two-year post-secondary educational institutions. These programs, which provide both general education and training in the basic dental sciences, consist of one year of theoretical training and one year of practical or simulated laboratory training. In the past decade, more than 3,300 technicians have graduated from these programs and approximately two-thirds were awarded an associate of arts or science degree.

Upon completion of an aggregate total of five years of training plus experience in dental technology, technicians are eligible to apply for certification by the National Board for Certification in Dental Laboratory Technology. Candidates for certification are required to complete a basic written examination covering history, jurisprudence, and ethics of the dental laboratory industry, and another written examination in at least one of the five laboratory specialties: complete dentures, partial dentures, crown and bridge, ceramics, and orthodontics. Candidates then must pass a practical examination in the specialty (or specialties) for which they seek certification. In 1974, there were 7,092 technicians certified in one or more specialties. Annual recertification requires evidence of participation in continuing education. There is close cooperation between the certification board and the National Association of Dental Laboratories, an organization of laboratory owners.

IV. Background Data: Comparison of National and South Dakota Dental Related Data

Chapter IV. BACKGROUND DATA: COMPARISON OF NATIONAL[1,2] AND SOUTH DAKOTA DENTAL[3,4] RELATED DATA

A. Basic Counts of Dentists/Number Per Population

In the U.S. in 1975, there were 112,020 active practicing dentists or 53 per 100,000 population. For comparison, South Dakota had 269 active dentists in 1975 or 39 per 100,000 population, ranking 40th among the 50 states. By May 1977, South Dakota had 276 active dentists or 40 per 100,000 population. Because the Dental Plan will be using patient visits as the unit of analysis, the concept of full-time equivalent (FTE)[5] number of dentists is not used in this plan. The South Dakota data in this report comes from The 1977 SDDA Survey of Dentists: A Linkage Report and from The Health Manpower Linkage Project files and methods. See Appendix 5 for a description of the survey and a copy of the questionnaire.

B. Specialists

In the U.S. in 1974, there were 11,825 specialists or about 11 percent of the active dentists were specialists. Most dentists are in general practice. In South Dakota in May 1977 there were 23 specialists or 8 percent of the active dentists were specialists.

C. Age Distribution of Dentists

Table 1 gives a comparison of the percentage distributions by age of active U.S. dentists in 1975 with South Dakota dentists in May 1977. The average South Dakota dentist is slightly older than the average dentist in the nation, averaging 46 years of age compared to 43 years.

D. Employment Settings

In the U.S. in 1975, 89 percent of all active dentists were in self-employed practices. The comparable figure for South Dakota in May 1977 was 85 percent. Of the 276 dentists in South Dakota in May 1977, 31 were employed by the Public Health Service, V.A., or military.

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[1] Dental Manpower Fact Book, Division of Dentistry (Manpower Analysis Branch), BHM, HRA, PHS, DHEW, Bethesda, Maryland, 1976.

[2] The 1975 Survey of Dental Practice, The American Dental Association, Chicago, 1977 (Survey conducted every 3 years).

[3] The 1977 SDDA Survey of Dentists: A Linkage Report, op. cit., pp. 1-25.

[4] "A Sample Survey of Non licensed Dental Personnel Working in Private Clinical Practices: Summary of 1974 South Dakota Results," loc. cit.

[5] Full-time equivalent means the equivalent number of persons working 40 hours a week.

Table 1. Comparison of the Percentage Distribution by Age of Active U.S. and South Dakota Dentists

Age Group	U.S. 1975	South Dakota May 1977
Under 45 years	57.0	46.1
Under 30 years	15.5	11.0
30-34 years	15.3	11.4
35-39 years	14.3	10.6
40-44 years	11.9	13.1
45-64 years	33.4	42.9
45-49 years	10.4	12.2
50-54 years	11.5	13.5
55-59 years	7.2	13.5
60-64 years	4.3	3.7
65 years and over	9.6	11.0
65-69 years	3.7	3.7
70-74 years	3.1	2.9
75 years and over	2.8	4.5
Average Age	43	46

There were 60 dentists not involved in solo practice. Of these there were 29 dentists who shared costs of office space and assistants; 13 were involved in complete partnerships; 7 employed at least one dentist; and 11 were employed by other dentists. Of the 60 dentists involved in group practice, there were 24 groups of 2 dentists, 2 groups of 3 and 1 group of 6 dentists.

In the U.S. in 1975, nearly 98 percent of all active dentists were involved in caring for patients while only 2 percent were involved in administration, teaching, and research. The comparable figures for South Dakota in May 1977 are 99 percent and 1 percent respectively. Also, in South Dakota in 1977, 15 dentists have practices in more than one location.

E. Auxiliaries

A national survey of dentists in 1974 reported that South Dakota dentists had an average of 2.14 non-licensed auxiliaries (excluding hygienists); the comparable U.S. average was 2.19.[6]

In South Dakota there were 0.24 FTE hygienists per dentist in 1977. Comparable U.S. figures are not available; however, in 1975 it was estimated that there were 26,900 active hygienists in the U.S. (working persons, full or part-time). This figures out to be 0.25 hygienists per U.S. dentist. If the 0.25 were adjusted to FTEs and to 1977, the number would probably be somewhat lower.[7] It, therefore, seems reasonable to conclude that South Dakota has approximately the same number of FTE auxiliaries per dentist as do dentists on the average around the nation.

F. Income of Dentists

The American Dental Association indicated that in 1974 the median net income of independent U.S. dentists was $30,500, ranging from $23,000 in South Dakota to $38,000 in Alaska and Connecticut.

G. Dentist Productivity Factors

It's estimated that in 1971 the average dentist in the U.S. worked 41 hours a week and 47 weeks per year. In 1976, South Dakota dentists worked an average 46 weeks, 17 worked 40-44 weeks, 145 worked 45-49 weeks and 57 worked 50-52 weeks. Data was not available for 39 dentists.

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[6]A 1977 survey in South Dakota reported 1.89 FTE non-licensed auxiliaries per dentist (see Table 2). Even though South Dakota data reported FTEs and there was three years difference between that data and the U.S. data, the results do not seem to be incompatible and some comparisons are made.

[7]Converting to 1977 would increase the number; changing to FTEs would decrease the number, probably more than the increase due to changing from 1975 to 1977.

Table 2. Full-Time Equivalent (FTE) Numbers of Dental Auxiliaries, Number per Dentist and Percentages According to Auxiliary Category - South Dakota, May 1977

Auxiliary Category	FTE	%	Number per Dentist
Non-Licensed	433	88.7	1.89
Receptionist/Secretary	136	27.9	0.59
Chairside Assistant (non CDA)	173	35.5	0.76
Certified Dental Assistant	99	20.3	0.43
Laboratory Technicians	14	2.9	0.06
Other Employees	11	2.3	0.05
Licensed	55	11.3	0.24
Hygienists	55	11.3	0.24
TOTALS	488	100.0	2.13

Table 3 gives a comparison of the busyness of the U.S. and South Dakota dentists. South Dakota dentists say they are not as busy as the average U.S. dentist.

Table 3. Comparison of the Busyness of U.S. and South Dakota Dentists

Busyness Category	U.S. (1975)	South Dakota (1977)
Too Busy or Over Worked	32%	17%
Enough Patients	46%	50%
Not Busy Enough	22%	32%

Table 4 gives a comparison between U.S. and South Dakota dentists of the waiting time to appoint new non-emergency patients. South Dakota dentists say it takes longer to get an appointment for a new non-emergency patient (about 2 weeks on the average compared with 1.7 nationally).

Table 4. Comparison between U.S. and South Dakota Dentists of the Waiting Time to Appoint New Non-Emergency Patients

Waiting Time	U.S.(1975)	South Dakota(1977)
Less than a week	43%	8%
1 to 1.9 weeks	30%	36%
2 to 3.9 weeks	18%	37%
4 weeks or more	9%	20%

In 1976, the average dentist in South Dakota produced 3345 patient visits. In 1975 the average U.S. dentist produced 3485 patient visits.

H. Education Data[8,9,10]

In the 1974-75 school year there were 58 dental schools, 20,146 students and 4,969 graduates. Of the 4,969 graduates, only 156 or 3.1% were female. However, more than 12% of the 1975-76 freshmen dental students were women. The increase of first-year dental students in the 12-year period from 1965 to 1977 was 56%.

In the 1974-75 school year there were 160 dental hygiene schools, 9,774 students and 4,568 graduates. There were also 237 schools offering training in dental assisting, with 9,024 students and 5,972 graduates. However, most dental assistants are trained on the job. There were also 38 training programs for dental laboratory technicians, 2,175 students enrolled and 836 graduates in 1975.

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[8]Health Resource Statistics, 1975, loc. cit.

[9]Dental Manpower Fact Book, loc. cit.

[10]South Dakota data in this section comes from the survey listed in footnote 3 and from data provided by the University of South Dakota (Dr. Darrell Ludeman) and the Lake Area Vocational Technical School (Dr. Max Johnson).

South Dakota has one dental hygiene program, one dental assisting program, and one dental laboratory technician program. The Dental Hygiene Program at University of South Dakota has graduated approximately 30 students each year since 1974 and projects 30 graduates for each of the next few years. There are from 5 to 8 applications for each of the 32 first year slots. Most (30 of 32) of the slots are filled by South Dakota students. About 60% of the graduates take their first job in South Dakota.

Lake Area Vocational-Technical School in Watertown graduated 19 dental assistants in June of 1977 and 19 more in September of 1977. Since 1974 the number of graduates has remained at 38 or 39 except for 1976 when 47 graduated. It is anticipated that in future years there will be about 40 dental assistant graduates per year. Graduates of the Dental Laboratory Technician Program at Lake Area Vocational-Technical School have varied from 14 in 1974 and 1975 to 18 in 1976 and 9 in 1977. Each year the school plans for 13 dental laboratory technician graduates.

I. South Dakota Dental Compact and Loan Forgiveness Programs

By South Dakota law (13-49-20.1) the State Board of Regents has been authorized since 1970 to "negotiate and enter into contractual agreements with public or private colleges and universities offering the study of dentistry for the purpose of reserving space each year for dental students from South Dakota. Such contractual agreements may include a provision that the Board of Regents in turn will pay a specific reservation fee for each and every student that is accepted for admittance, and sponsored by the Board of Regents, to the study of dentistry."

By South Dakota law (13-56A-3) the Board of Regents is also "authorized to grant financial assistance in the form of a scholarship loan to South Dakota resident students ... for the purpose of studying ... or dentistry ..." If the student returns to South Dakota and practices dentistry the loan is forgiven at a rate of 20% per year. An additional 10% is forgiven per year if the student practices in a county which does not have a town over 5,000. If the student does not return to South Dakota, he must begin repaying the loan and interest is then charged at the maximum legal rate.

The programs created by these laws will be referred to as the "Dental Compact program", "Dental Loan Forgiveness Program" and the positions that dental students hold will be called "slots." Tables 5 through 8 and the text that follows give a detailed description and analysis of the effectiveness of the Dental Compact and Loan Forgiveness Programs. There are two basic findings presented in this analysis: 1) to date the total cost of the programs per South Dakota dentist produced has been relatively low at approximately $35,000 and will potentially be less than $30,000 if some of those in advanced training and the service return to South Dakota; 2) data from the first four years shows that the program at Nebraska has been less costly per South Dakota dentist produced than those at Loyola.

To begin the analysis Tables 5 and 6 give basic background information on the Compact and Loan Forgiveness Programs. Table 5 gives the cost per slot in thousands of dollars and the filled dental compact slots (shown in parenthesis). The Compact Program at Loyola began in the

fall of 1970 with 10 slots at $3,000 each, with only 6 being used. The number of slots at Loyola was dropped to 5 in 1974 with an option for 5 more. In 1973 the slots at Loyola were raised to $4,000 each. It is estimated that 5 slots at $4,000 each will be used in 1978.

The Compact Program at the University of Nebraska also began in 1970. South Dakota had reserved 8 slots at $3,000 each and used 5. In the fall of 1973 the Nebraska slots were increased in cost to $4,000; to $6,000 in 1975; to $8,000 in 1977; and estimated to be $9,000 in 1978. The number of slots was reduced to 6 in 1977 and is estimated to be reduced to 5 in 1978.

The Compact Program at Creighton University was begun in the fall of 1975 with 5 slots at $4,000 each. It was increased to $6,000 in 1976 and is estimated to be $7,500 in 1978.

Table 6 shows the number of dollars loaned to dental students according to school and class. The dollar amount has steadily risen from $17,085 in 1970 to $185,900 in 1976 (the program began in 1969, but figures are not shown so as to be compatible with the start of the compact). All of the loans listed for Loyola and Nebraska are all also compact students. Most of those listed under "others" were at Creighton before the compact started. Two of the "others" were students at the University of Minnesota, one at Iowa and one at Washington University.

Now that the background data in Tables 5 and 6 has been presented and discussed, we proceed to analyze the "success" of the two programs. For the purpose of this plan "success" is defined as the return of the student to South Dakota as a practicing dentist. Table 7 shows the status of students in the Dental Compact and/or Loan Forgiveness Programs from 1970 through 1976. Since only the first four classes have graduated, we will base our analysis on the years 1970 through 1974. Of the 62 students assisted by these two programs in the first four classes, 47 participated in both programs five participated in only the compact, and 10 participated in only the loan program. It is therefore difficult to analyze the independent effect of each program. During the first four classes, the 62 students produced 28 new dentists for South Dakota or a "success rate" of 45%. There are 19 students in advanced training or in the service. Some of these potentially will come back to South Dakota (best guess is 30% or 6). The additional 15 are either not dentists or are practicing out of state and are assumed not to return. Potential sucess is therefore ((28 + 6) ÷ 62) 55%.

Table 5. Cost Per Slot in Thousands of Dollars and the Number of Dental Compact Slots Filled (shown in parenthesis) South Dakota - 1970-1978

School	Class	FALL OF 70	71	72	73	74	75	76	77	78(estimate
Loyola	Freshman	3(6)[a]	3(5)	3(9)	4(3)	4(8)	4(5)	4(5)	4(5)	4(5)
	Sophomore		3(5)	3(5)	3(9)	4(3)	4(8)	4(6)	4(3)	4(5)
	Junior			3(5)	3(5)	3(9)	4(3)	4(8)	4(6)	4(3)
	Senior				3(5)	3(5)	3(9)	4(3)	4(8)	4(6)
Nebraska	Freshman	3(5)	3(8)	3(8)	4(8)	4(8)	6(8)	6(8)	8(6)	9(5)
	Sophomore		3(5)	3(8)	3(8)	4(8)	6(8)	6(8)	6(8)	8(6)
	Junior			3(5)	3(8)	3(7)	4(8)	4(8)	6(8)	6(8)
	Senior				3(5)	3(8)	3(7)	4(8)	4(8)	6(8)
Creighton	Freshman						4(5)	6(5)	6(5)	7.5(5)
	Sophomore							4(5)	6(5)	6(5)
	Junior								4(5)	6(5)
	Senior									4(5)
Total Cost[c]		63[b]	84	123	185	195	244	290	344	382.5
Appropriations				150	210	224	218	274	332	

[a]Six slots at $3,000 per slot

[b]63,000 dollars

[c]Total cost including cost of unfilled slots

Table 6. Number of Dollars Loaned to Dental Students - South Dakota - 1970-1976

School	Class	FALL OF 70	71	72	73	74	75	76
Loyola	Freshman	$8,285	$4,500	$21,975	$ 5,600	$14,800	$15,200	$ 8,400
	Sophomore	7,100	7,100	12,000	14,000	7,500	16,000	21,000
	Junior			15,000	14,500	15,500	9,000	18,000
	Senior				10,250	15,000	18,000	9,000
Nebraska	Freshman	7,300	4,500	20,000	16,700	8,500	14,500	17,500
	Sophomore		5,600	11,000	18,000	20,600	12,500	17,000
	Junior			10,050	10,600	16,000	23,500	15,000
	Senior				12,000	12,000	18,000	23,000
Creighton	Freshman							
	Sophomore						10,000	12,500
	Junior							14,500
	Senior							
Others	Freshman	1,500	500	3,000	10,000	14,500	0	0
	Sophomore		1,800	1,500	3,000	13,000	16,300	0
	Junior			6,000	2,500	3,000	15,000	15,000
	Senior				6,000	3,000	3,000	15,000
Totals		$17,085	$24,000	$100,525	$123,150	$143,900	$171,000	$185,900

Table 7. Status of Students in Dental Compact and/or Loan Forgiveness Programs- South Dakota - 1970-1976

Freshman Class	School	Slots Paid	Slots Used	Loans	S.D. Dent.	Service/ Adv. Train.	Non S.D. Dent.	Non Dent.
#1 (70-71)	Total	18	11	13	8	0	4	1
	Loyola	10	6	6	4	0	1	1
	Nebraska	8	5	5	3	0	2	0
	Other	0	0	2	1	0	1	0
#2 (71-72)	Total	18	13	11	6	2	4	2
	Loyola	10	5	5	1	1	3	0
	Nebraska	8	8	5	4	1	1	2
	Other	0	0	1	1	0	0	0
#3 (72-73)	Total	18	17	16	5	9	1	3
	Loyola	10	9	8	1	6	1	1
	Nebraska	8	8	7	3	3	0	2
	Other	0	0	1	1	0	0	0
#4 (73-74)	Total	18	11	17	9	8	0	0
	Loyola	10	3	3	1	2	0	0
	Nebraska	8	8	8	3	5	0	0
	Other	0	0	6	5	1	0	0
#5 (74-75)	Total	13	16	19				
	Loyola	5	8	7				
	Nebraska	8	8	5				
	Other	0	0	7				
#6 (75-76)	Total	18	18	20				
	Loyola	5	5	7				
	Nebraska	8	8	8				
	Creighton	5	5	5				
	Other	0	0	0				
#7 (76-77)	Total	18	18	15				2
	Loyola	5	5	3				2
	Nebraska	8	8	7				
	Creighton	5	5	5				
	Other	0	0	0				

Another way of estimating "success" is by looking at the cost of the programs. This is given in Table 8. The total cost to date of the two programs per South Dakota dentist produced is $35,200. Please note that this is a maximum cost and that if some of the dentists in advanced training or in the service were to return to South Dakota, the cost would be less. For example, if 6 were to return as guessed above, the cost would be lowered to below $30,000.[a] Also note that to date the "success" rate at Nebraska has been better than at Loyola, but several more years of data is needed to verify this conclusion. There are also some intangibles such as the flexibility at Loyola to go as high as 10 slots even though only 5 are guaranteed; this might affect the difference in real cost at the two schools. Finally, note that no conclusions are drawn about the relative effectiveness of the compact program as opposed to the Loan Forgiveness Program. No conclusions were drawn because the students participated in both programs.

Some additional background information on the Compact Program was provided in the Survey of South Dakota Dentists, May 1977. It showed that 58 percent of the dentists felt that the number of slots was too many, 29 percent felt the number of slots was sufficient and only 1 percent felt that the number of slots was not enough (12% did not respond). Also, of those responding to the survey who graduated between 1974 and 1977 (same years as the compact and loan forgiveness analysis above), 13 were part of both the Compact and Loan Programs, 2 were part of the Loan Program (only); 1 was part of the compact (only); 9 were from out of state and 5 were part of the National Health Service Corps.

J. Utilization of Dental Services

In 1974, the National Center for Health Statistics reported that 49.3 percent of the U.S. population visited a dental office at least once. The percent of the population and the number of dental visits per person per year both vary considerably by sex, age, income, education, and several other variables. Table 9 summarizes these differences. In South Dakota in 1976 it is estimated that the average person in the State visited a dentist 1.3 times compared to 1.6 nationally in 1975.

K. Trends

The number of active practicing dentists per 100,000 population in the U.S. decreased from 52 in 1950 to 50 in 1970. It has been increasing since then, reaching 53 in 1975. In South Dakota the decrease continued until 1975 when it reached 39 (down from 41 in 1965). In 1977, it started back up, standing at 40 active dentists per 100,000 population.

Nationally there has been an increase in the number of specialists and the percentage of dentists who are specialists from 2,584 in 1952 (3% of the dentists) to 11,825 in 1974 (11% of the dentists). South Dakota is behind that trend, registering 8 percent in May 1977.

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[a]For the first four classes.

Table 8. Cost Analysis of South Dakota Dental Compact and Loan Fourgiveness Programs - First Four Classes (70-71 through 73-74)

Freshman Class	School	Students	S.D. Dent.	Costs of Slots	Loans to be Forgiven[a]	Costs per S.D. Dent.[b]
#1 (70-71)	Total	13	8	$144,000	$65,650	$26,200
	Loyola	6	4	75,000	33,350	27,100
	Nebraska	5	3	69,000	25,500	31,500
	Other	2	1	0	6,800	6,800
#2 (71-72)	Total	14	6	$171,000	$46,600	$36,300
	Loyola	5	1	75,000	10,500	85,500
	Nebraska	8	4	96,000	28,600	31,100
	Other	1	1	0	7,500	7,500
#3 (72-73)	Total	18	5	$201,000	$60,500	$52,300
	Loyola	9	1	111,000	11,000	122,000
	Nebraska	8	3	90,000	37,500	42,500
	Other	1	1	0	12,000	12,000
#4 (73-74)	Total	17	9	$202,000	$94,300	$32,900
	Loyola	3	1	76,000	11,500	87,500
	Nebraska	8	3	126,000	32,300	52,800
	Other	6	5	0	50,500	10,100
1st 4	Total	62	28	$718,000	$267,050	$35,200
	Loyola	23	7	337,000	66,350	57,600
Classes	Nebraska	29	13	381,000	123,900	38,800
	Other	10	8	0	76,800	9,600

[a]Total amount of the loan to those who are now South Dakota dentists (Fall 1977)

[b]Based on the 28 who have to date become South Dakota dentists: these costs will be lower if more of these dentists return in the future.

Table 9. Number of Dental Visits Per Program Within A Year, By Demographic Characteristics, For Selected Years, 1957-1958 through 1974

Demographic Characteristics	Number of Dental Visits Per Person Per Year								
	57-58	63-64	69	69-70	70	71	72	73	74
All Person	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.6	1.7
Sex									
Male	1.4	1.4	1.4		1.4	1.4	1.3	1.4	1.5
Female	1.8	1.7	1.6		1.7	1.7	1.7	1.8	1.8
Age									
Under 5 years		0.3	0.3			0.3			
5-14 years		1.9	1.8			1.8			
15-24 years		2.0	1.7			1.8			
(Under 17)				1.4	1.4		1.5	1.6	1.6
(17-24 years)				1.7	1.8		1.7	1.7	1.7
25-44 years		1.9	1.6		1.7	1.7	1.6	1.7	1.7
45-64 years		1.7	1.6	1.6	1.5	1.6	1.7	1.7	1.8
65 years and over		0.8	1.0	1.1	1.1	1.0	1.0	1.1	1.2
Color									
White	1.7	1.7	1.6			1.6			
All other	0.5	0.9	0.7			0.8			
Family income									
Less than $3,000		0.8	0.8			0.8			
$ 3,000 - $ 4,999		1.0	1.0			1.1			
$ 5,000 - $ 6,999		1.6	1.1			1.0			
$ 7,000 - $ 9,999		1.9	1.4			1.4			
$10,000 - $14,999		2.6	1.9			1.7			
$15,000 or more		3.4	2.5			2.5			
Education of head of family									
Less than 5 years	0.8	0.6	0.6			0.6			
4 - 8 years	1.2	1.1	0.9			0.9			
9 - 12 years	1.7	1.6	1.5						
(9 - 11 years)						1.2			
(12 years)						1.6			
13 years or more	2.7	2.6	2.2			2.2			
Usual activity									
Preschool (under 6 years)		0.5	0.4			0.4			
School age (6-16 years)		2.0	1.9			1.9			
Usually working (17 years and over)		1.7	1.6			1.6			
Keeping house (female, 17 yrs. & over)		1.6	1.5			1.6			
Retired (45 years and over)		0.8	0.9			0.9			
(Going to school)						2.1			
Other activity (17 years and over)		2.0	1.7			1.1			
Places of residence									
All SMSA	1.9	1.8	1.6	1.7		1.8			
Outside SMSA:									
Nonfarm	1.3	1.2	1.2	1.2		1.2			
Farm	1.0	0.9	1.1	1.1		0.9			
Geographic region									
Northeast	2.2	2.1	1.8	1.9		1.9			
North Central	1.6	1.5	1.4	1.4		1.4			
South	1.0	1.1	1.1	1.2		1.2			
West	1.8	1.7	1.8	1.7		1.8			

SOURCE: National Center for Health Statistics, Current Estimates from the Health Interview Survey, United States, 1974. DHEW, PHS Publication Series 10, Number 100, September, 1975 and prior years.

Nationally the annual number of patient visits per dentist has increased from 2,504 in 1950 to 3,500 in 1975, an annual percent increase of 1.2. A peak was reached in 1967 of 3,629 with a decrease shown between 1967 and 1975. No trend data is available for South Dakota.

Table 10 shows the trends nationally in dentist busyness from 1964-1975. Since 1967 there has been a slow but clear trend toward the dentist being less busy.

There has been large, consistent increases since 1950 in the absolute number of hygienists and the number per 100 active dentists. In 1950, there were 3,190 hygienists or 4 per 100 dentists. By 1975 there were 26,900 or 24 per 100 active dentists. Although good past data do not exist, a similar increase in hygienists may have occurred in South Dakota. There were 71 licensed hygienists in 1970 in South Dakota compared with 99 in 1975.

The number of dental schools has grown steadily from 41 in the 1949-1950 school year to 58 in the 1974-1975 school year. Similarly the number of graduates has grown from 2,565 to 4,969 in the same 25-year period. In 1976 the number of graduates was 5,330. The number of applicants per first year slot has risen from 1.7 in 1960 to 2.6 in 1965, where it has remained.

Table 10. Percent Distribution of Independent U.S. Dentists According to Practice Busyness, by Selected Years: 1964-1975

Description of Practice Busyness	1964	1967	1970	1972	1975
Too Busy or Over Worked	40.3	45.4	37.0	34.4	31.6
Enough Patients	36.8	40.8	44.1	43.8	46.1
Not Busy Enough	22.9	13.8	18.9	21.8	22.3

Source: Bureau of Economic Research and Statistics, The Survey of Dental Practice. Chicago. American Dental Association, published Triennially.

Nationally the percentage of persons with one or more annual dental visits has risen slowly from 42 percent in 1963 to 49 percent in 1974. The number of dental visits per person remained at 1.6 in the late 50s and early 60s dropped to 1.5 in 1969 and remained there until 1973. In 1973 it increased to 1.6, in 1974 to 1.7 and in 1975 it was back to 1.6.

L. Some Selected Data by Dental Trade Area in South Dakota

Tables 11, 12, 13 and 14 and Figures 1 and 2 give a variety of data for the South Dakota dental trade areas in 1977. The distribution of the 276 active practicing dentists in 1977 is shown in Figure 1 and Table 11. Most are in the Sioux Falls and Rapid City trade areas, but a distribution throughout the State is evident. The distribution of dental hygienists per dentist in 1975 is shown in Figure 2. Table 11 shows that according to dental trade area the average number of weeks to appoint non-emergency new patients varies from 7.3 in the Belle Fourche area and 5.5 in the Winner area to less than 2 weeks in the Pine Ridge, Rapid City, Mitchell, Madison and Yankton areas.

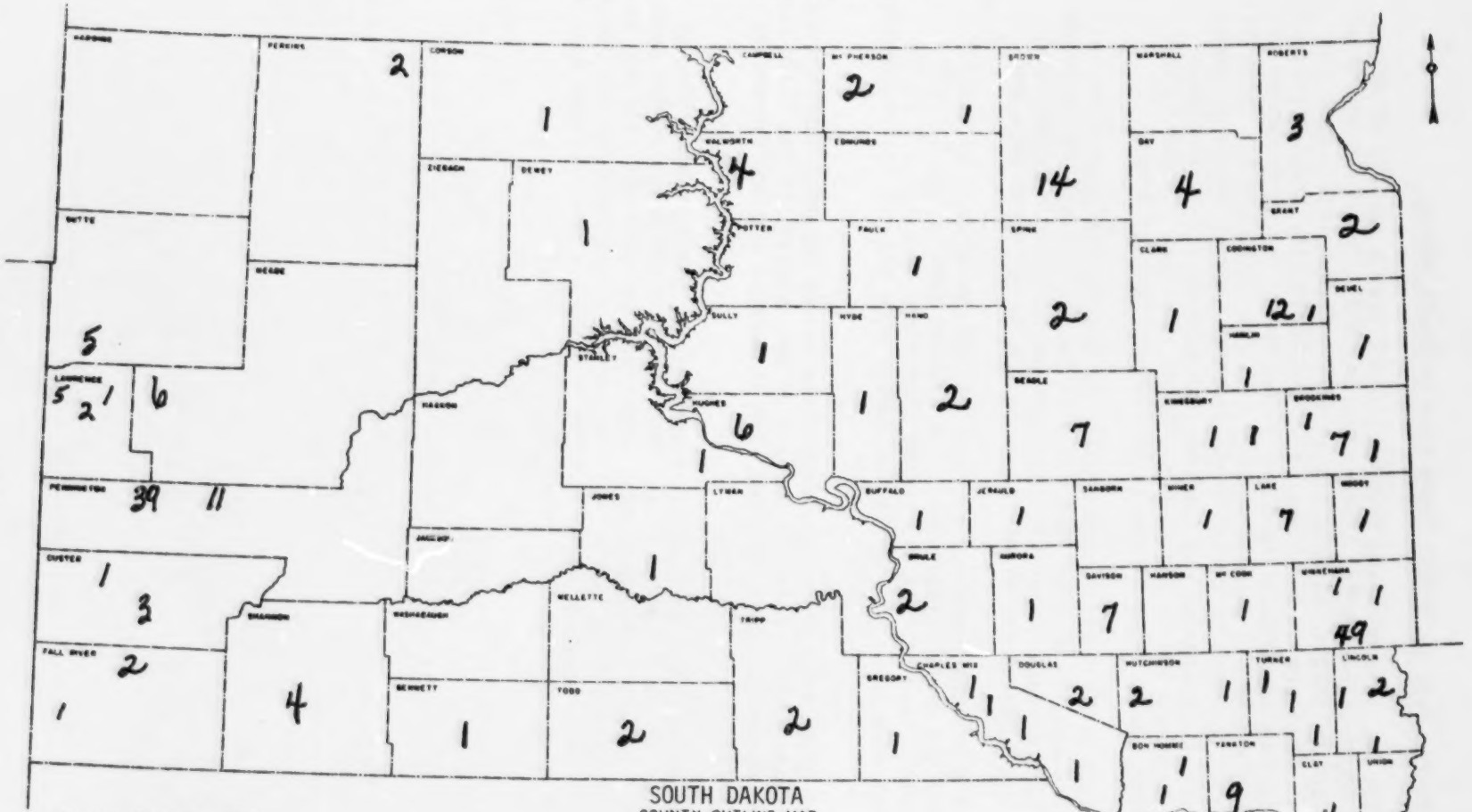
The average patient visits per dentist in 1976 ranged from 2,485 in the Pierre area to greater than 4,000 in the Chamberlain and Watertown areas. The average number of visits per person in 1976 ranged from 0.9 in the Mobridge and Winner areas to 1.8 in the Rapid City area.

Table 12 gives the number of FTE auxiliaries per dentist by type of auxiliary and dental trade area. The average dentist has 2.1 FTE auxiliaries, ranging from 0.3 in the Pine Ridge area and 1.1 in the Brookings area to 2.7 in the Belle Fourche area and 2.8 in the Chamberlain area.

Table 13 gives the percentage of dentists by the busyness question and dental trade area. Almost 30 percent of the dentists in the State say they are not busy enough compared with 16 percent who are overworked or too busy.

Table 14 gives the number of active practicing dentists according to age group and dental trade area. Most of the trade areas do not seem to be in danger of losing a large proportion of their dentists due to death and retirements in the next few years. Exceptions are the Madison area with 50 percent of their dentists over 60 and the Mobridge area with 38 percent of their dentists over age 60.

Figure 1. Distribution of Active Dentists in South Dakota, May 1977, by Practice Site



State Total: 276

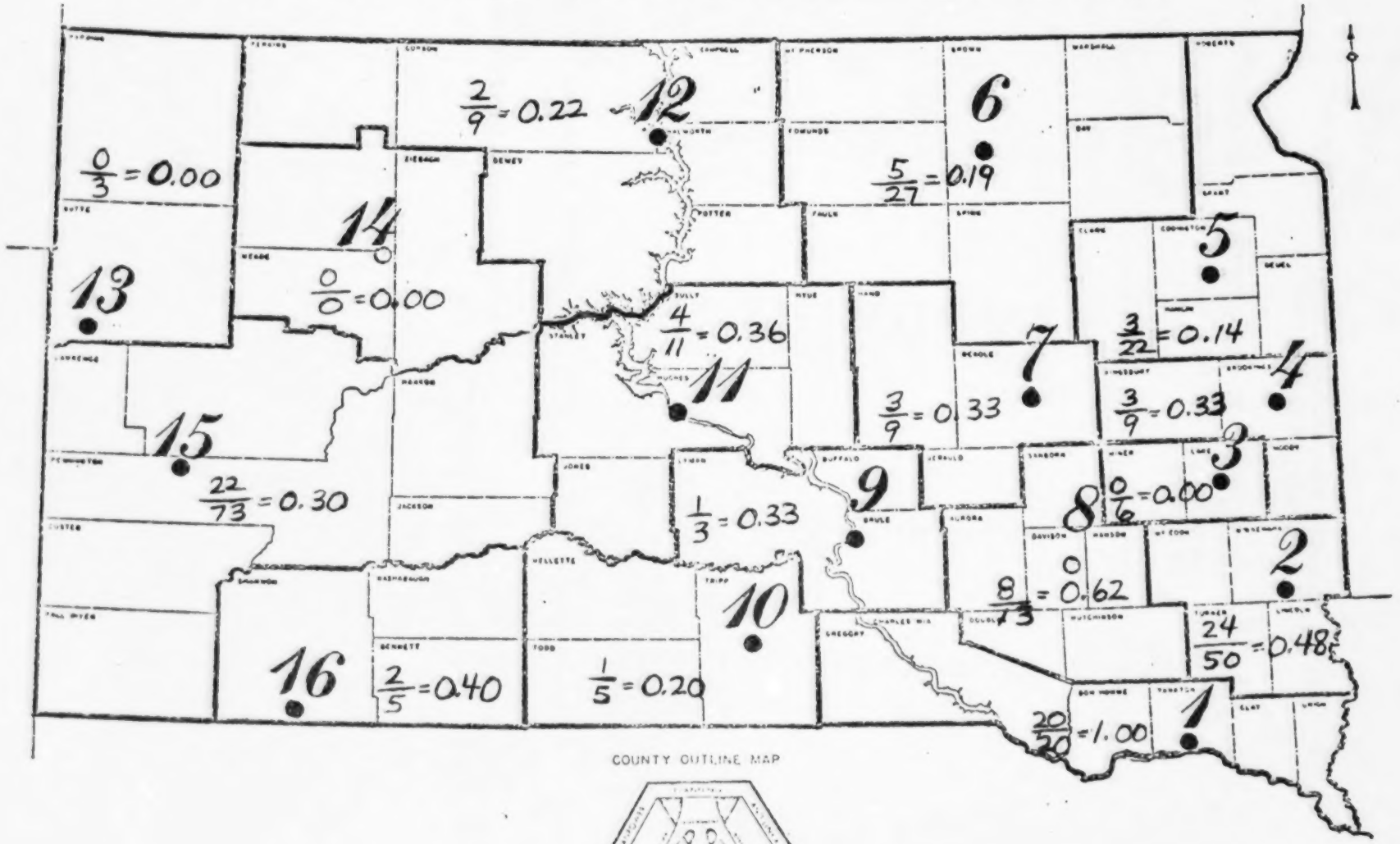
Table 11. Selected Statistics by Dental Trade Area - South Dakota, May 1977

Dental Trade Area	No. of Dentists	Average Weeks To Appoint New Patients	Average Patient Visits Per Dentist In 1976	Average Number of Visits Per Person In 1976	Trade Area Population[b]
South Dakota	276	2.4	3,345	1.3	685,993
Yankton	23	1.7	3,206	1.1	66,997
Sioux Falls	59	2.4	3,385	1.5	129,944
Madison	6	1.3	3,136	1.3	14,544
Brookings	12	3.0	3,377	1.1	35,901
Watertown	21	3.3	4,298	1.5	59,855
Aberdeen	24	2.4	3,684	1.2	75,092
Huron	10	2.6	3,203	1.1	28,725
Mitchell	15	1.5	3,476	1.2	43,286
Chamberlain	4	4.0	4,288	1.5	11,474
Winner	4	5.5	3,760	0.9	17,534
Pierre	9	2.3	2,485	1.0	22,469
Mobridge	10	4.4	2,584	0.9	29,606
Belle Fourche	3	7.3	3,383	1.0	10,037
Faith[a]	--	--	--	--	4,597
Rapid City	71	1.6	3,102	1.8	122,728
Pine Ridge	5	1.0	3,345	1.3	13,204

[a]No dentist in the Faith area as of May, 1977; NHSC dentist started in the summer of 1977.

[b]Provisional estimates for July 1, 1976 provided by South Dakota Department of Health, Public Health Statistics Program.

Figure 2. Number of Dental Hygienists Per Dentist According to Dental Trade Area - 1975



COUNTY OUTLINE MAP

Table 12. Number of FTE Dental Auxiliaries Per Dentist by Type of Auxiliary and Dental Trade Area - South Dakota, May 1977

Dental Trade Area	All Auxs.	Recpt./ Sec.	Chair Assistants (Non CDA)	Certified Dental Assistants (CDA)	Hygienist	Lab Tech.	Others
South Dakota	2.1	0.6	0.7	0.4	0.2	0.1	0.0
Yankton	2.0	0.5	0.7	0.3	0.4	0.1	0.1
Sioux Falls	2.3	0.6	0.8	0.5	0.3	0.0	0.1
Madison	1.3	0.4	0.6	0.2	0.0	0.0	0.2
Brookings	1.1	0.3	0.5	0.2	0.1	0.0	0.0
Watertown	2.6	0.7	0.4	1.1	0.3	0.1	0.0
Aberdeen	1.9	0.7	0.6	0.5	0.1	0.0	0.0
Huron	2.0	0.7	0.9	0.3	0.1	0.0	0.0
Mitchell	2.3	0.6	0.9	0.5	0.2	0.1	0.0
Chamberlain	2.8	0.9	0.7	0.6	0.4	0.0	0.3
Winner	1.9	0.2	1.5	0.0	0.0	0.0	0.2
Pierre	1.9	0.5	0.9	0.4	0.1	0.0	0.0
Mobridge	1.8	0.5	0.8	0.3	0.1	0.1	0.0
Belle Fourche	2.7	0.9	1.5	0.0	0.3	0.0	0.0
Faith*	--	--	--	--	--	--	--
Rapid City	2.1	0.5	0.8	0.3	0.2	0.1	0.1
Pine Ridge	0.3	0.1	0.1	0.0	0.1	0.1	0.0

*No dentist in the Faith area as of May, 1977; NHSC dentist started in the summer of 1977.

Table 13. Percentage of Dentists by the Busyness Question and Dental Trade Area - South Dakota, May 1977

Dental Trade Area	BUSYNESS QUESTION			
	Too Busy Or Over Worked	Enough Patients	Not Busy Enough	No Response
SOUTH DAKOTA	15.9	46.5	29.8	7.8
Yankton	9.1	72.7	0.0	18.2
Sioux Falls	16.0	57.1	23.2	3.6
Madison	66.6	16.7	16.7	0.0
Brookings	16.7	50.0	25.0	8.3
Watertown	10.0	30.0	35.0	15.0
Aberdeen	15.7	50.0	25.0	8.3
Huron	10.0	40.0	50.0	0.0
Mitchell	6.7	26.7	46.7	20.0
Chamberlain	33.3	66.7	0.0	0.0
Winner	50.0	50.0	0.0	0.0
Pierre	11.1	55.6	22.2	11.1
Mobridge	45.8	37.5	12.5	0.0
Belle Fourche	66.7	33.3	0.0	0.0
Faith[a]	--	--	--	--
Rapid City	5.6	38.9	50.0	5.6
Pine Ridge[b]	--	--	--	--

[a]No dentists in Faith Trade Area as of date of survey; NHSC Corps dentist started in Faith in the Summer of 1977.

[b]Insufficient data and confidentiality caused this to be left blank.

Table 14. Number of Active Practicing Dentists*
According to Age Group and Dental Trade Area - South Dakota, May 1977

Dental Trade Area	Total	AGE GROUP ≤29	30-39	40-49	50-59	60-69	70+
South Dakota	245	27	54	62	66	18	18
Yankton	22	1	5	4	7	3	2
Sioux Falls	56	8	12	11	16	4	5
Madison	6	1	0	1	1	2	1
Brookings	12	2	2	3	2	0	3
Watertown	20	3	4	4	7	1	1
Aberdeen	24	2	5	5	11	1	0
Huron	10	3	2	3	2	0	0
Mitchell	15	1	4	4	4	1	1
Chamberlain	3	0	1	1	0	1	0
Winner	2	0	1	0	1	0	0
Pierre	9	1	3	2	2	1	0
Mobridge	8	2	0	1	2	0	3
Belle Fourche	3	0	0	3	0	0	0
Faith	0	0	0	0	0	0	0
Rapid City	54	3	14	20	11	4	2
Pine Ridge	1	0	1	0	0	0	0

* Does not include the 31 PHS, VA and military dentists.

Chapter V. ASSESSING THE ADEQUACY OF THE NUMBER OF DENTISTS AND AUXILIARIES IN SOUTH DAKOTA IN 1977

A. Dentists

Nationally there were shortages of dentists in the late 50s and 60s. As a result public dollars were increased to support dental schools and more dentists were produced. During the late 60s and early 70s Minnesota and other adjacent states began to obtain more dentists. Consequently, South Dakota began to obtain an overflow of more dentists from these states. Most estimates by the mid 70s show that the shortages have been mostly if not completely eliminated.

As of May 1977 there were 276 active dentists or 40 dentists per 100,000 population. This included 5 National Health Service Corps dentists, 12 in PHS Indian Health Service facilities, 10 at Ellsworth Air Force Base and 9 in the 3 V.A. facilities. Since the comparable figure for the nation was 53 dentists per 100,000 population, South Dakota would need 364 dentists or 88 more dentists to equal the national average. Although this is certainly one method of determining adequacy, it has been increasingly discredited in the literature in recent years and is presented here only for comparison purposes.[1] It was not chosen by the Dental Subcommittee as the method of assessing adequacy.

In 1976 it was estimated that the 276 South Dakota Dentists supplied 923,220 patient visits. During that same year the estimated demand was 1,015,609 patient visits. The demand was estimated by applying national rates by age group and rural/urban mix to South Dakota (see Table 9). The following matrix for patient visits per person per year was used:

Age Group	Rural	Urban
<18	1.2	1.8
18-64	1.3	1.9
65+	0.9	1.3

If as the measure of adequacy one chose to compare supply and demand, this analysis shows that 91% of the demand is met or a shortage of about 92,000 visits. If one uses 3345 patient visits a year (1976 South Dakota current productivity), as the productivity of the "short" dentists, then South Dakota is short about 27 dentists. Note that this is quite different from the 88 dentists short that was a result of using the dentist/population ratio method above.

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[1] M.F. Bognanno, J.R. Jeffers and C. Oliven, "Evidence of the Physician Shortage," Labor and Manpower, Ames, Iowa, 1974, pp. 131-153.

In order to complete the analysis some value judgments must be made. How many dentists do we really need? At what number of dentists would the situation be critical, justifying the expenditures of public dollars and justifying intervention into the dental market? It was the value judgment of the Dental Subcommittee that the critical need came when the number of dentists in South Dakota per 100,000 population was less than 2/3 of the national dentist population standard (50 per 100,000 set in 1970 when that was the U.S. ratio). This was arrived at by considerable discussion and was basically the criteria used by the federal government for eligibility for certain programs. In addition the Subcommittee felt these critical needs should be adjusted for the South Dakota age distribution and the South Dakota fluoridation and that the analysis should be based on a comparison of patient visits supplied with the critical need stated in visits. The calculations are given in Tables 15 and 16. Coincidentally, you will note that this is the same as using 70% of demands met as a cut-off point. The critical need is estimated to be about 726,000 patient visits in 1976. Since 923,000 visits were supplied in 1976, 127% of the critical needs are met for the State in aggregate. South Dakota has 59 dentists more than the minimum or critical needs. However, South Dakota has a "demand shortage" of 27 dentists.

But what about the distribution of dental services within the State? The percentage of critical needs met ranges from 165% in the Rapid City dental trade area to 77% in the Winner area and 0 in the Faith area. The percentage demands met ranges from 111% in the Chamberlain dental trade area to 64% in the Winner area and 0 in the Faith area.

The Dental Subcommittee has chosen the critical needs method as the best way of determining dental shortage areas within the State. By this method the following five dental trade areas are labeled as critical need shortage areas: Belle Fourche, Faith, Mobridge, Pierre, and Winner. These areas include 17 counties and a portion of another county. The counties included in the trade areas labeled as shortage areas are: Butte, Campbell, Corson, Dewey, Harding, Hughes, Hyde, Jones, Meade (upper half), Mellette, Perkins, Potter, Stanley, Sully, Todd, Tripp, Walworth and Ziebach.

Even though there are 5 dental trade areas and 18 counties labeled as critical need shortage counties, three dentists properly placed would meet the critical needs of all trade areas that need at least one dentist (several areas need between 0 and 1 dentist to meet critical needs).

All but the Rapid City, Chamberlain and Watertown dental trade areas have less than 100% of their demands met. Without redistribution from areas with greater than 100% demands met, 30 dentists properly placed would meet the demand shortages in the State.

B. Adequacy of Dental Auxilaries

As has already been shown, the number and types of auxilaries in South Dakota equals the national averages for numbers of auxilaries per dentist.

Table 15. Need, Supply and Demand of Dental Visits
South Dakota, 1976

Dental Trade Area	VISITS					
	Estimated Supply[a]	Estimated Demand[b]	To Meet U.S. Rate[c]	Age Adjust.[d]	Fluoride Adjust.[e]	Estimated Critical Need[f]
South Dakota[g]	923,220	1,015,609	1,097,589	-8,521	2,415	725,986
Yankton	73,738	93,708	107,195	-953	-84	70,462
Sioux Falls	199,715	203,899	207,910	-1,327	3,678	141,026
Madison	18,816	20,623	23,270	-392	185	15,314
Brookings	40,524	53,938	57,442	-322	242	38,234
Watertown	90,258	82,944	95,768	-1,290	506	63,093
Aberdeen	88,416	107,844	120,147	-1,258	-2,477	76,403
Huron	32,030	42,690	45,960	-497	-1,078	29,080
Mitchell	52,140	60,065	69,258	-1,079	-1,621	43,495
Chamberlain	17,152	15,409	18,358	-157	-373	11,715
Winner	15,040	23,594	28,054	57	578	19,347
Pierre	22,365	34,140	35,950	-686	424	23,717
Mobridge	25,840	38,727	47,370	-377	-518	30,701
Belle Fourche	10,149	14,817	16,059	-126	0	10,585
Faith	0	5,642	7,355	8	-146	4,768
Rapid City	220,242	199,663	196,365	-63	2,475	133,387
Pine Ridge	16,725	17,909	21,126	-59	624	14,656

a - From South Dakota Survey of Dentists (May 1977).
b - Age and rural/urban mix, see page 34.
c - 1.6 times the population.
d - U.S. rate adjusted for area age distribution and utilization by age.
e - adjusted for the percentage of the population estimated to have received fluoride (natural or controlled) during the years the teeth were developing.
f - 0.667 times column three (to meet U.S. rate) plus age and fluoride adjustments.
g - Totals do not add due to rounding.

Table 16. Percentage Needs and Demand Met - South Dakota, 1976

	Dental Trade Area	% Critical Needs Met	% Demands Met	Number of Dentists	NUMBER OF DENTISTS SHORT[a] Critical[b] Need	Demand[b]
	South Dakota	127	91	276	-59	27
	Rapid City	165	110	71	-25	-6
	Chamberlain	146	111	4	- 1	0
	Sioux Falls	141	109	59	-17	-2
	Watertown	143	98	21	- 8	1
	Madison	123	91	6	- 1	0
	Mitchell	120	87	15	- 2	2
	Aberdeen	116	82	24	- 3	5
	Pine Ridge	114	93	5	0	0
	Huron	110	75	10	0	3
	Brookings	106	75	12	0	4
	Yankton	105	78	23	0	5
Critical Need Shortage Areas[c]	Belle Fourche	96	68	3	0	1
	Pierre	94	66	9	0	3
	Mobridge	84	67	10	1	3
	Winner	77	64	4	1	2
	Faith	0	0	0	1	1

[a]Calculated using an average of 3,345 visits per dentist; a plus indicates a shortage and a minus indicates a number greater than 100%, not necessarily a surplus.

[b]These columns will not sum to the total because each area was rounded down, with the idea that an area could not support any fraction of a dentist.

[c]These were the shortage areas as of May 1977. However, by the time this is published in February 1978, there have already been changes. Anyone who uses these areas should first update the data.

Furthermore, when asked in May 1977 how many additional certified dental assistants or hygienists they would hire if they were available, only a small percentage of the dentists said they would hire any. There were 20 dentists who said they would hire a full-time certified dental assistant (CDA) and 10 a part-time CDA if they were available; there were 7 who said they would hire a full-time hygienist and 32 said they would hire a part-time hygienist if they were available. Apparently there is a small excess demand for CDAs and hygienists. However, better data and methods are required for a more complete analysis of the auxiliary situation. A placement service and better communication between the schools and dentists should, however, be adequate to solve any dental auxiliary problems. Increasing or decreasing the number of graduates of any of the three programs does not seem warranted, at least not until better data and methods are available.

CHAPTER VI. PROJECTIONS

Projections will be made on a state basis because of lack of data and the uncertainties involved.

Population

The State Planning Bureau and South Dakota State University are currently developing these projections. Based on discussions with these people we have estimated the population as follows: 1980 (687,000); 1985 (698,000); 1990 (725,000).

Demand

The 1977 South Dakota estimated demand was 1.48 visits per person per year. It is expected to gradually grow in the future for several reasons. First, the national average was 1.6 in 1975. Second, South Dakota has fewer persons with dental insurance and a lower average income than the nation as a whole. It is anticipated that both the number of persons on dental insurance and average income will increase in the future resulting in higher dental utilization. Third, public awareness and National Health Insurance with a dental provision probably for children only, should increase utilization. Demand is therefore estimated to be: 1980 (1.50); 1985 (1.54); 1990 (1.56). The U.S. rate is expected to stay at 1.6 or increase very slowly. We will use 1.6 for 1980; 1.62 for 1885; and 1.64 for 1990.

Productivity

As more younger dentists reach their productive years, average productivity nationally will increase because of greater use of auxiliary personnel and better equipment and techniques. South Dakota productivity is now slightly lower than the U.S. average.

Also, South Dakota currently has about the same number of auxiliaries as the nation as a whole. As a result, South Dakota productivity should increase at the same rate as the nation on the whole.

Fieldstein[1] shows that the annual increase in visits per dentist from 1955 to 1970 was 1.2 percent. Since then there have been indications of smaller increases or leveling off. It is estimated that future productivity increases will not match the 1955-1970 pace. An increase of 1/2 of one percent per year will be estimated as the increase from the 3,345 in 1976. The results are: 1980 (3,395); 1985 (3,480); 1990 (3,570).

Number of Dentists

It is estimated that the number of dentists in the future will grow due to several factors.

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[1]Paul J. Fieldstein, Financing Dental Care: An Economic Analysis. D.C. Health and Company, Lexington, Massachusetts, 1973.

1. The gains in new South Dakota dentists will continue through 1985 at a rate of 15 dentists per year. The period 1985-1990 will see a drop from 15 to 14 per year. These projected annual gains are neighboring states and the training of large numbers of dentists nationally.[1] It is also assumed that compact and loan forgiveness programs will contribute to those annual gains; however, the extent to which they will either separately or jointly, is difficult to isolate.

2. Losses due to deaths, retirements and those leaving the State in 1976-1990 will average 12 dentists per year. The details of these calculations are given in Tables 17 and 18 and Figure 3.

Table 19 shows the percent critical needs for dentists will continue to greatly exceed 100% through 1990. The percentage of demands met will almost reach 100% by 1990.

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[1]Support and documentation of this can be provided on request. For those interested please contact Dr. Dick Baker, Indian Health Service, Aberdeen or Dr. Walt Ackerman, President of the South Dakota Dental Association, Rapid City.

Figure 3. Number of Practicing Dentists in South Dakota in 1970-1977 plus Projections for 1980, 1985 and 1990

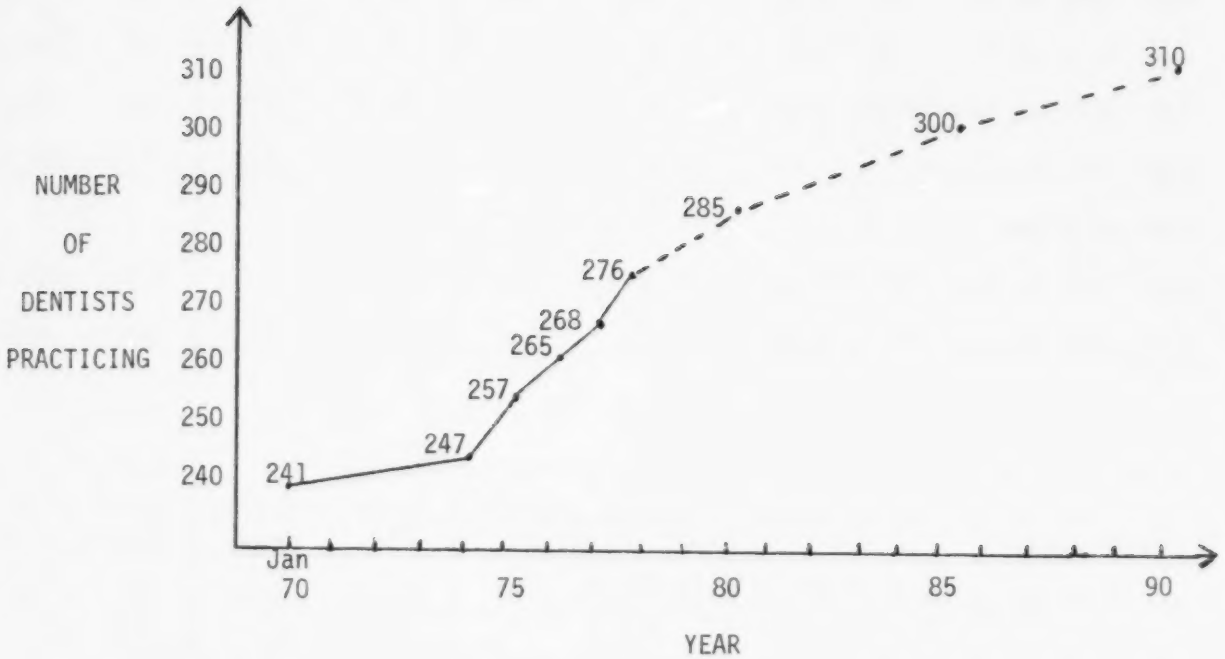

Table 17. Gains and Losses of South Dakota Dentists During the Period of January 1970 through July 1977

		GAINS					
Time Period	Number of Years	Compact & Loan	Yearly Ave.	All Others	Yearly Ave.	Total Gains	Yearly Ave.
Jan. 1970 to Jan. 1974	4.00	0	0.0	39	9.8	39	9.8
Jan. 1974 to Feb. 1975	1.08	4	3.7	17	15.7	21	19.4
Feb. 1975 to June 1976	1.33	4	3.0	20	15.0	24	18.0
June 1976 to July 1977	1.08	7	6.5	9	8.3	16	14.8
Average Gains							
Jan. 1970 to July 1977	7.50	15	2.0	85	11.3	100	13.3
Jan. 1974 to July 1977	3.50	15	4.3	46	13.1	61	17.4

		LOSSES					
Time Period	Number of Years	Deaths, Retired Left State	Yearly Ave.	Newly 70	Yearly Ave.	Total Losses	Yearly Ave.
Jan. 1970 to Jan. 1974	4.00	30	7.5	3	0.8	33	8.3
Jan. 1974 to Feb. 1975	1.08	7	6.5	5	4.6	12	11.1
Feb. 1975 to June 1976	1.33	14	10.5	2	1.5	16	12.0
June 1976 to July 1977	1.08	11	10.2	2	1.8	13	12.0
Average Losses							
Jan. 1970 to July 1977	7.50	62	8.3	12	1.6	74	9.9
Jan. 1974 to July 1977	3.50	32	9.1	9	2.6	41	11.7

Table 18. Projections of Supply, Demand and Need for Dentists in South Dakota - 1980, 1985 and 1990

Year	Number of Dentists	Projected Supply of Visits	Visits To Meet U.S. Rate	Visits Demanded	Visits to Meet Critical Need
1977	276	923,220	1,097,589	1,015,609	725,986
1980	285	967,575	1,099,200	1,030,500	725,500
1985	300	1,044,000	1,130,760	1,074,920	742,300
1990	310	1,106,700	1,189,000	1,131,000	778,900

Table 19. Projections of Percentage Demand and Need Met and Number of Added Dentists to Meet Critical Needs or Demands in South Dakota for 1980, 1985 and 1990

Year	% Critical Needs Met	% Demand Met	Supply	Number of Dentists Short To Meet Needs	Number of Dentists Short To Meet Demand
1977	127	91	276	-59	27
1980	133	94	285	-71	18
1985	141	97	300	-87	8
1990	142	98	310	-92	7

*Plus indicates shortages; Minus indicates greater than 100%, not necessarily a surplus.

Chaper VII. Special Situations

A. Prevention

1. General

During the course of the Dental Subcommittee's deliberations the topic of "prevention" came up frequently. In fact, the philosophy of the Subcommittee contained a major statement on prevention.

The Subcommittee used as a basis for its study a 1974 document prepared by the Manpower and Education Committee of the American Association of Public Health Dentists (see Appendix 4). There was also close coordination of efforts with the South Dakota Dental Association, especially its Council on Dental Health. The recommendations on prevention that appear in the next chapter are a result of this effort.

2. Fluoridation

In 1975, 49.4 percent of the total U.S. population drank fluoridated water. Among the states, South Dakota ranked 15th with 61.5 percent.[1] By State law all towns of 500 population or more in South Dakota must fluoridate their water supplies if deficient in natural fluoride. Most of the rest of the population is in sparsely populated areas, some of which have natural fluoride.

Fluoridation is a cost effective method of prevention. Costs are estimated to be about 15¢ per person per year. In addition, fluoridation has been proven to be the only effective public health program for the entire population. Extensive research has shown that dental decay is safely reduced by two-thirds for children who drink fluoridated water during the years their teeth are developing.

B. Continuing Education

The need for continuing education of dentists drew special attention by the Subcommittee. South Dakota was one of the original two states to make continuing education for dentists mandatory.

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[1] Fluoridation Census 1975, U.S. Department of HEW, PHS, Center for Disease Control, Atlanta, Georgia, April, 1977.

Chapter VIII. SUMMARY AND RECOMMENDATIONS WITH PRIORITY RATINGS

A. Methods

This short chapter presents all the recommendations with identification of their relative priority. Assessments that precede each recommendation (or set) are summaries of the details given in previous chapters.

The priorities identified are given at three levels: 1-Top priority, 2-Medium priority, and 3-Low priority. Before presenting the definitions used for these priorities, consider the basis for prioritizing recommendations.

All recommendations presented are considered important and valuable. It is our intent that they should all be carried out. However, we recognize that for reasons unknown at this time the agencies involved may be unable to carry out all applicable recommendations in the immediate or near future. Indeed other recommendations from other health manpower areas will legitimately compete for attention with those provided here. In view of these facts we provide our considered judgment in applying one of the three priority categories to each of our recommendations.

The basic principle in identifying priority levels comes from benefit-cost analysis. "Benefits" and "costs" are construed to be all benefits and costs including those which we don't commonly think of having a dollar value; in effect such benefits and costs are assigned or imputed a dollar value. Simply put, the total expected benefits of each program should be carefully assessed and complete expected costs of each recommendation should be assessed. Of course, any program which entails more costs than it provides benefits should not be undertaken. Indeed those programs which have the highest ratio of benefits to costs should be undertaken first, the second highest ratio should be done next and so on. In this way we can assure that the most benefit is provided for a given amount of resources. In consequence a program with high benefits and little or no costs will have a high priority. Negative recommendations will be treated here and since they entail little or no costs they may attain high priority even though their only benefits may be to release resources to use in other programs. Programs with very high costs may attain a low priority even though they have clear benefits. Finally some programs may be uncertain or marginally beneficial and attain a lower priority. It is the combination of benefits and costs which establishes the priority.

True benefit-cost analysis involves thorough detailed analysis of each recommendation. We recognize that we are constrained by our own resources from undertaking such basic research. We rely instead on reports from other researchers on the relative merits of the particular program. Such current research indeed rarely contains a final benefit-cost ratio number. We must use such research where available and provide our best judgment given these sources. Instead of a precise ratio number we provide our judgment as to the general range we expect the program to attain.

The three priorities are defined as follows:

1. Top priority - A high expected benefit-cost ratio; the program can and should be undertaken as soon as possible; it should be done first if not all programs can be undertaken at once.

2. Medium priority - Benefits are expected to substantially outstrip costs, yet the program attains a ratio in the middle range. It strongly merits implementation and defers only to top priority if conflict should occur.

3. Low priority - Benefits are definitely expected to outstrip costs. Yet due to substantial costs and/or uncertain or mild benefits this recommendation may in conflicts be deferred to a higher priority.

   The priority rating "TOP", "MEDIUM", or "LOW" is given at the end of each recommendation. We emphasize that all recommendations made here are expected to provide more benefits than costs. Their ratios thus are all greater than one, and they all ideally should be carried out.

B. Introduction

As is detailed in the preface, South Dakota had many dental problems in the 1960s and earlier. Through cooperative arrangements of the South Dakota Dental Association, the South Dakota Health Department, South Dakota Legislature and other groups, programs were developed beginning in 1966 to alleviate the problem. By 1976 the results of these programs were being noticed. For the first time in years, more dentists were coming into the State than were leaving. However, good figures and methods were not available to assess the effects of these programs and then predict the future needs for such programs. This planning document has attempted to meet those needs. The summary and recommendations to follow are based on the details developed in the previous pages of this plan.

C. Aggregate Supply of Dentists in South Dakota

The background data in this plan gives a indication of the dental situation in South Dakota. Summarizing the appropriate facts show that:

- South Dakota dentists have only slightly lower average productivity than the U.S. dentists average productivity. Also, the majority of South Dakota dentists do accept new patients and give indications that they are not overworked.

- South Dakota dentists have a sufficient number of dental auxiliaries and use about the same number of auxiliaries as the average U.S. dentist.

- In South Dakota there is a lower utilization of dentists by the population than in the U.S. due to a large rural population and the associated factors of low income and the low use of pre-payment plans and dental insurance.

- South Dakota ranks 15th of all states in fluoridation levels with 61% of the population having fluoridated water.

- South Dakota is presently having a net in-migration of dentists due to the Compact and Loan Forgiveness Programs and due to the large number of dentists being produced in the U.S. and some overflowing into South Dakota.

- Current trends and projections reinforce the above arguments with an increasing productivity of South Dakota dentists, a continuing supply and utilization of dental auxiliaries, a large proportion of the State's population continuing to be rural and South Dakota maintaining a net in-migration of dentists. These trends and projections show South Dakota's net improvement in number of dentists.

A method of assessing the adequacy of dentists was developed using this background information and other pertinent data. This assessment shows that 127% of South Dakota's Critical Needs are currently met and the critical needs will exceed 140% by 1990. In addition, 91% of Current Demand is met. Projections also, forecast that by 1990, South Dakota's demand will be 98% met. The basic conclusion of these assessments is that the programs created in the late 1960's and early 1970's have been successful in improving South Dakota's number of dentists and therefore public dollars can now be reduced for supporting these programs. The Dental Subcommittee therefore recommends that:

1) In light of apparent trends towards supply and demand equilibrium and because critical needs are met in South Dakota, a reduction in the South Dakota Dental Compact Program be made with a review and ongoing evaluation. This recommendation is made from a purely manpower standpoint; the Subcommittee, however feels that anybody considering action on this resolution should seriously balance this consideration with the loss of an excellent educational opportunity for South Dakota students (South Dakota Board of Regents, South Dakota Dental Association).

   BENEFITS: Frees public dollars for use in other areas.

   COSTS: For any remaining slots.

   PRIORITY: TOP

D. Maldistribution of Dentists in South Dakota

Recognizing that the aggregate supply of dentists in South Dakota is adequate relative to needs and demand of the population, South Dakota's geographic composition does leave isolated areas where the immediate access to dentists is difficult. As a result of the assessments there are 5 dental trade areas, which includes 18 counties, that are designated as critical need shortage areas. Recognizing that these shortage areas do exist, it is a worthwhile expenditure of some public dollars to alleviate these distributional problems. The Subcommittee therefore recommends that:

1) Federal programs use the shortage area designations developed in this plan and its successors for determining eligibility for federal loan forgiveness programs (South Dakota Health Department, Federal Government, South Dakota Board of Regents, HSA).

   BENEFITS: Allow for federal loan forgiveness to encourage dentists to practice in shorgage areas. Reduces number of counties eligible for loan forgiveness and allows forgiveness of loans to dentists willing to practice in these areas.

   COSTS: Nominal administrative costs.

   PRIORITY: TOP

2) State Loan Forgiveness Program be modified to emphasize the placement of dentists in shortage areas developed in this plan and its successors by offering differential loan forgiveness rates. We recommend (S.D.D.A., South Dakota Board of Regents):

   - 33 1/3% per year for dentists while in shortage areas until 100% of the loan is forgiven.

   - 5% per year in all other areas until 50% of the loan is forgiven.

   BENEFITS: Encourages dentists to practice in shortage designated areas, provides minimal loan forgiveness to dentists willing to practice anywhere in South Dakota. Considerable savings to State over current program.

   COSTS: Low

   PRIORITY: TOP

3) Only counties within trade areas that are designated as shortage areas developed in this plan and its successors be eligible for National Health Service Corps dentists (S.D.D.A., South Dakota Health Department, NHSC, HSA).

BENEFITS: Provides NHSC dentists where other dentists may be unwilling to practice. Provides NHSC dentists in areas where they can do the most good.

COSTS: A few administrative costs.

PRIORITY: TOP

4) The placement service currently funded by the State Department of Health and administered by the South Dakota Dental Association be continued and streamlined (South Dakota Dental Association, South Dakota Legislature, South Dakota Health Department, University of Minnesota).

BENEFITS: Information and possibly better distribution of dentists and auxiliaries.

COSTS: Some by user (low or no costs to public).

PRIORITY: TOP

E. Adequacy of Auxiliary Workforce

The utilization of dental auxiliaries is a key factor in the number of dentists South Dakota will need. Data from the plan details the utilization of auxiliaries in South Dakota. Especially, the utilization of non-licensed auxiliaries per South Dakota dentist is approximately the same as the U.S. rate. Dentists should be encouraged to evaluate increasing their own productivity through the use of dental auxiliaries. Recognizing that dental auxiliaries are central to this plan, the Subcommittee recommends:

1) The number of graduates from the Dental Assisting, Laboratory Technology, and Dental Hygienists programs in the State should be maintained at their present levels, but not increased (Lake Area Vocational Technical School, University of South Dakota, South Dakota Board of Regents and Vocational-Technical Education Board, S.D.D.A.).

BENEFITS: Provides enough graduates for dentists to hire and assuring graduates will find jobs.

COSTS: Costs of programs.

PRIORITY: TOP

F. Prevention

The philosophy of the Dental Subcommittee has stressed the importance of preventive dental health activities. Research has shown that preventive dental health is a benefit/cost effective method of reducing dental disease and therefore it is an important determiner of dental needs. The Subcommittee therefore recommends that:

1) Every effort should be extended to encourage children to adopt and enjoy good food habits. The availability of confections and soft drinks on school premises may tempt children to spend lunch money for them and lead to poor food habits. Their high energy value and continued availability are likely to affect children's appetites for regular meals. Expenditures for soft drinks and most confections yield a nutritional return greatly inferior to that from milk, fruit, and other foods in the basic food groups. When given a choice between soft drinks and milk or between candy and fruit, a child may choose the less nutritious. In view of these considerations the Dental Subcommittee is particularily opposed to the sale and distribution of confections and soft drinks in the schools (S.D.D.A., State Board of Education, School Food Services Director for the State, Department of Health, School Districts).

   BENEFITS: Children will enjoy better nutrition and eating habits and experience less dental disease when sweets are less available.

   COSTS: Distribution of statement, very low.

   PRIORITY: TOP

2) A demonstration project be endorsed to set up a system of preventive programs for institutionalized and home bound individuals (South Dakota Department of Health, Legislative Research Council).

   BENEFITS: The system and impacts of preventive dental care to such a program and such individuals would then be known.

   COSTS: Would include the research and developmental costs. Costs are anticipated to be moderate.

   PRIORITY: MEDIUM

3) Development of system to screen and care for institutionalized and home bound individuals (South Dakota Department of Health, Legislative Research council, S.D.D.A.).

   BENEFITS: Dental problems in these persons will be better known. Some additional care provided.

COST: The recommendation does not intend that all care costs be paid for with public money. Cost would include the development and design of the system as well as administrative costs and some care costs. Total costs expected to be high.

PRIORITY: MEDIUM

4) A demonstration project on preventive dentistry be instituted on a small scale to study the benefits on dental health education as part of the school curriculum (S.D. Dept. of Health, Board of Education, Legislative Research Council).

BENEFITS: Provide information on cost/benefit ratio and improvement of the state of oral health of children and young adults.

COSTS: Moderate

PRIORITY: MEDIUM

5) Fluoridation be expanded to include all organized water systems (South Dakota Department of Health, South Dakota Dental Association, South Dakota Environmental Protection Agency, South Dakota Legislature).

BENEFITS: Fewer cavities for those not now on fluoridated water. This preventive program does not require individual motivation.

COSTS: Cost of adding fluoride to water systems without fluoride. Costs are low.

PRIORITY: MEDIUM

6) Report periodically be prepared by the EPA on its surveillance program to insure that fluoridation levels are adequate (South Dakota Department of Health, South Dakota Environmental Protection Agency, S.D.D.A.).

BENEFITS: Awareness

COSTS: Costs of reports (low)

PRIORITY: TOP

G. Data and Methodology Recommendations

The use of empirical data and objective methodologies to support the subjective evaluations of the Subcommittee in preparing the plan are important for the plan's accuracy and credibility. Future updates of the plan will require updated data and where possible better data and improved methods should be utilized. The Subcommittee therefore recommends:

1) That more accurate trade areas using central place theories be developed for use in future updates of the Dental Plan (South Dakota Health Department, HSA).

BENEFITS: Development of trade areas that may better reflect dentists distribution and consumer utilization.

COSTS: Staff time to develop trade areas. Cost expected to be moderate.

PRIORITY: MEDIUM

2) A survey of dental practice (similar to the 1977 survey conducted by the South Dakota Dental Association and the Manpower Linkage Project) be conducted every three years (South Dakota Dental Association, South Dakota Department of Health, Health Systems Agency).

BENEFITS: Current data on South Dakota dentists is available on a timely basis. The information on location, productivity and utilization projections and trend analysis. Very high benefits.

COSTS: Moderate costs of questionnaire, distribution and processing of responses.

PRIORITY: TOP

3) A minimum data set on dentists be maintained and updated every six months. This set of data is intended to contain only a few essential items and will function as a registry (South Dakota Dental Association, State Dental Board, South Dakota Department of Health, Health Systems Agency).

BENEFITS: A current registry and minimum data on dentists is kept very current and used as a mailing list, etc.

COSTS: Costs of maintaining list and updates. Expected to be low.

PRIORITY: TOP

4) Methodology for assessing the adequacy of dental auxiliaries and auxiliary data requirements should be researched and/or developed for inclusion in future dental plans (South Dakota, Health Department, HSA).

BENEFITS: A more precise understanding of the role of dental auxiliaries will be available for planning.

COSTS: Staff time to research and/or develop methods, obtain the required data, administrative costs.

PRIORITY: MEDIUM

5) Methodology to relate dental manpower to dental health status be developed for use in comprehensive dental planning efforts (South Dakota Department of Health, South Dakota Dental Association).

BENEFITS: To know more precisely the impact of dental health manpower upon dental health. This would give a measure of the dental health status of South Dakota relative to the number of dentists. Interpretation problems make benefits uncertain.

COSTS: Costs of researching and developing the methodology in staff time and administrative efforts.

PRIORITY: LOW

H. Miscellaneous Recommendations

There are some recommendations that do not fall into the preceding sections and are therefore grouped together as miscellaneous. The recommendations suggested by the Subcommittee are:

1) That the continuing education requirements for dentists be raised to 75 hours over a three year period with a minimum of 20 hours being obtained per year. A part of this recommendation is a conversion by the Board of Dental Examiners to the continuing education unit system (South Dakota Board of Dental Examiners, South Dakota Dental Association, South Dakota Department of Commerce and Consumer Affairs, South Dakota Department of Health).

BENEFITS: More awareness by dentists of professional and technological changes. Brings South Dakota into conformance with National Dental Health Council recommendations.

COSTS: Increased costs for more continuing education units, low administrative cost.

PRIORITY: MEDIUM

2) Peer review of dentists is endorsed as the method of maintaining the standards of dental practice. It should be appropriately coordinated with other health care quality assurance programs.

BENEFITS: Standards of dental practice are enforced for South Dakota dentists by a professional review board.

COSTS: Administrative costs of review board.

PRIORITY: TOP

3) A full time dental director be hired by the State to coordinate dental activities by the Department of Health. This person should be a dentist with a MPH (South Dakota Department of Health, South Dakota Dental Association, South Dakota Legislature).

BENEFITS: More coverage of dental activities and greater involvement of Health Department in dental activities.

COSTS: Salary of dental director, high costs (money saved from the "compact" could be used to defray costs).

PRIORITY: TOP

APPENDICES

DENTAL TRADE AREAS

COUNTY OUTLINE MAP

APPENDIX 2

Summary of the activities of the Dental Subcommittee.

June 19, 1976

This was the initial meeting of the Subcommittee. Several questions were asked regarding the role and purpose of the Dental Subcommittee. A reaction to Health Needs and Resources in South Dakota: A Source Book was given by the representative from the Council on Dental Health. Also discussed and drafted was the Philosophy for the Dental Subcommittee.

Procedurally, a chairman and vice-chairman were chosen and a 2/3 majority was decided as necessary to pass motions.

September 10 and 11, 1976

In this second meeting, the Subcommittee delved into the available data and methods that were presented by staff. The three principal items that were discussed were the Non-Licensed Auxilaries and Active Rates, Dental School & Age of Certified Assistants, and the Dental Shortage Area Methods.

Two important tasks which the Subcommittee accomplished were the creation of a utilization grid and the designation of dental trade areas.

October 15, 1976

The changes in the methods were discussed and approved informally. Several topics were suggested by the Subcommittee as future discussion topics. They included: 1) the future needs for dental hygienists, dental assistants, and dental laboratory technicians; 2) the continuing education area; 3) placement services; 4) preventive programs; and 5) the hygienist and their role. It was decided not to do a study of specialists. The trade area map was approved also.

January 27 and 28, 1977

At this meeting, Dr. Max Johnson from the Lake Area Vocational School in Watertown discussed the education of dental assistants and dental lab technicians. Also included in the discussion was information concerning salaries, utilization of dentists, and appropriateness of training.

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Dr. Whillock (periodontist from Rapid City) presented a proposal before the Subcommittee to initiate a pilot project where grades 1, 3, and 5 would have their teeth properly brushed and flossed for 5 to 10 minutes once every two weeks by the appropriate dental personnel.

As a result of a report given on the soft drinks and candy machines found in public schools, a resolution encouraging students to adopt and enjoy good food habits was mailed to the South Dakota Dental Association and the League of Women Voters.

Finally, there was a discussion on the basic question "Does demand = need for the purposes of the Dental Subcommittee?"

June 4, 1977

At this meeting several resolutions from the South Dakota Dental Association were read. These resolutions related to the following topics: Title 19, Expanded Function Auxiliaries, Peer Review, Prevention, Fluoridation, and a Health Service Placement Booklet. There was considerable discussion concerning four of the topics. Concerning Title 19 funds, the Subcommittee explored the utilization of Title 19 monies. Concerning expanded function auxiliaries, a recommendation was passed recommending that the State Dental Association review the State Dental Practice Act for the purpose of allowing individual dentists to determine the utilization of manpower in his office. In the area of prevention, the Subcommittee withdrew endorsement of the Swedish Program and endorsed demonstrative preventive care and screening programs for institutionalized and homebound individuals. Concerning fluoridation, the Subcommittee endorsed fluoridation programs for any organized water system.

November 18, 1977

At this meeting a completed draft of the plan was discussed thoroughly and recommendations were added to the plan. There was considerable discussion on all topics and controversy on whether to substantially cut the Compact Program, and also considerable discussion about NHSC and prevention. The Plan as amended was tentatively approved pending a redraft and mailing to the Subcommittee.

February 15, 1978

As a result of the review by the Technical Methods Subcommittee, the Dental Subcommittee met again to see that the recommendations flowed from the Plan. There was considerable discussion, mainly about the Compact and Loan Forgiveness Programs. A few parts of the Plan were modified for clarity and a compromise was reached on the first recommendation.

APPENDIX 3
DENTAL SUBCOMMITTEE MAILINGS

1. Dental Subcommittee Mailing #1: June 2, 1976

   A. Transmittal Letter
   B. Agenda June 19 - Dental Subcommittee - Dental 1-1
   C. Dental Subcommittee Members, Dental 1-2
   D. Philosophy Re Nurse Needs: Philosophy of the Nursing Needs and Resources Task Force, Dental 1-3
   E. Philosophy of Health - Paul H. Reinke, D.D.S. - Dental 1-4
   F. Meeting Schedule - Dental 1-5
   G. Dental Manpower Planning and Distribution: A Survey of the Literature, David Born - Dental 1-6
   H. Transmittal Letter - Sister Mary Schneider, Dental 1-7
   I. Goal - Objectives - Dental 1-8
   J. Transmittal Letter - Darrell Ludeman - Dental 1-9

2. Dental Subcommittee Mailing #2: August 17, 1976

   A. Transmittal Letter
   B. Minutes of June 19th Meeting - Dental 2-1
   C. Non-Licensed Auxilliaries and Active Rates of dentists - Dental 2-2
   D. Dental School + Age of Certified Assistants - Dental 2-3
   E. Dental Shortage Areas, Dental 2-4
   F. Data Sheets - An Analysis of Shortages: 1970-1975 Data By County and Planning District - Dental 2-5

3. Dental Subcommittee Mailing #3: October 4, 1976

   A. Transmittal Letter, October 4, 1976, Dental 3-0
   B. Agenda, Dental 3-1
   C. Data Sheets - An Analysis of Shortages: 1970-1975 Data by County and Planning District An Update, Dental 3-2
   D. Topics, Dental 3-3
   E. Dental Trade Areas, Dental 3-4
   F. Dental Subcommittee Members, Dental 3-5
   G. Dental Subcommittee Minutes, Meeting #2, September 10 & 11, 1976, Dental 3-6
   H. Dental Trade Areas Med Shrt/3,000 1975, September 15, 1976, Dental 3-7
   I. Med Shrt/3,000 1975/1974, Dental 3-8

4. Dental Subcommittee Mailing #4:
   A. Transmittal Letter, January 14, 1977, DENT 4-0
   B. Dental Subcommittee Meeting #3 Minutes, October 15, 1976, DENT 4-1
   C. Guidance or Process to Follow in Developing Recommendations and the Dental Manpower Plan, DENT 4-2
   D. Dental Committee Methods Report, DENT 4-3
   E. Analysis of Data Sheets, DENT 4-4
   F. Current Auxiliary Data and Analysis, DENT 4-5
   G. Prevention, DENT 4-6
   H. Special Situations, DENT 4-7
   I. Future Projections, DENT 4-8
   J. Data Discussions, DENT 4-9
   K. Recommendations, DENT 4-10
   L. Outline of Dental Manpower Plan, DENT 4-11
   M. Early, Periodic Screening, Diagnosis & Treatment, Addendum to DENT 4-7,1-24-77
   N. Comparison of DENT PØP with Demand Shortages and Examination of Possible Need Cut-Off Levels Accroding to Dental Trade Areas - South Dakota 1975 Addendum to DENT 4-4, 1-25-77
   O. American Dental Association Statement on Expanded Function Dental Auxiliary Utilization and Education, Addendum to DENT 4-5, 1-26-77

5. Dental Subcommittee Mailing #5: April 26, 1977

   A. Transmittal Letter, April 26, 1977, DENT-5-0
   B. Dental Questionnaire, DENT-5-1
   C. Minutes of the Dental Subcommittee, January 27 & 28, 1977, DENT-5-2
   D. American Dental Association Statement on Expanded Function Dental Auxiliary Utilization and Education, DENT-5-3
   E. Early, Periodic Screening, Diagnosis & Treatment, EPSD&T, DENT-5-4
   F. Prepaid Dental Care Glossary, DENT-5-5

6. Dental Subcommittee Mailing #6:May 27, 1977

   A. Transmittal Letter and Agenda, May 27, 1977, DENT-6-0
   B. Outline of Dental Plan, DENT-6-1
   C. Assessing the Adequacy of Dental Patient Visits during 1975 According to Trade Area, DENT-6-2 (Handed out a Meeting)
   D. Dentist Practice Sites - Jan. 1, 1977, Current Trade Areas Method, DENT-6-3(Handed out at Meeting)

7. Dental Subcommittee Mailing #7: August 11, 1977

   A. Transmittal Letter, August 11, 1977 , DENT 7-0
   B. Response to Dental Questionnaire, DENT 7-1
   C. Minutes of the Dental Subcommittee, June 4, 1977, DENT 7-2

8. Dental Subcommittee Mailing #8: Sent out 11-10-77

   A. Transmittal Letter, 11-10-77, DENT 8-0
   B. Draft of Dental Plan, DENT 8-1

9. Dental Subcommittee Mailing #9, sent out 1-20-78

   A. Transmittal Letter notifying dental meeting date Feb. 15th., DENT 9-0, 1-20-78

10. Dental Subcommittee Mailing #10: sent out 2-3-78

   A. Transmittal Letter, 2-1-78, DENT 10-0
   B. Minutes of the Dental Subcommittee Meeting #6, 11-18-77, DENT 10-1
   C. Dental Plan DRAFT, DENT 10-2, 2-1-78
   D. Scenarios and Calculations (Supply, Demand, & Critical Need), DENT 10-3, 1-31-7
   E. Resolution from the Council on Dental Health, DENT 10-4
   F. Information on fluoridation surveillance, DENT 10-5

APPENDIX 4

ASSOCIATION BUSINESS
1974 COMMITTEE REPORTS

1974 Report of Committee on Research

Charge to Committee: The Committee on Research is charged with keeping informed of questions and problems in the area of public health research. This year President Gernert suggested that, in collaboration with the Manpower and Education Committee, the problems presently inherent in the lack of (or weakness of) evaluation of dental health education and preventive programs provided to community groups be considered.

Evaluation of all preventive programs, whether educational or treatment-oriented, should be based on effectiveness of dental disease control at a practical or money-saving level. This report then will deal with the various preventive measures in use or proposed for use in public health programs and cost-benefit estimates of these programs. Considered will be the practicability of fluoridation, school fluoridation, fluoride tablets, topical fluorides, fluoride self-application, fluoride mouth-rinse, preventive dentistry or *Toothkeeper* programs, and sealants.

A. *Fluoridation*

Ignoring esthetic and health benefits, the cost-benefits alone of fluoridation are tremendous. Using data from incremental and dental studies, Davies estimates that a dentist can provide regular six months' care for 45-57 percent more children in a fluoridated area. After four-and-a-half years of fluoridation only one third-one fourth of the time needed before fluoridation is required for initial care for children. He estimated the cost at 43 percent less, or for every dollar invested, $6.60 are saved.

Fluoridation should remain the AAPHD's first priority program.

B. *School Fluoridation*

Davies estimates that the data obtained after 12 years of school fluoridation at Elk Lake show a saving of about 2.5 DMFT per child. If estimated as a saving of five restorations, the cost-benefit is 1:15, or $15.00 for every dollar invested.

School fluoridation should rate as the second priority.

A note of caution: these cost-benefit data are figured with children over a short period of time. With fluoridation, there are data to show that benefits continue and even expand in later life. With school fluoridation and other procedures to be discussed, there are no solid data that benefits derived in a few years do not dissipate in time with the cessation of treatment.

On the other side of the coin, one also should not lose sight of the importance to the individual of the esthetic, psychological, and health benefits of preventing disease even though the benefits may not always be permanent.

C. *Fluoride Tablets*

Paulsen reviewed some 30 clinical trials of fluoride tablets in 1969 and concluded that this method can reduce caries incidence 20 to 40 percent. Additionally, data are now available which indicate that fluoride-tablet consumption may have a positive effect even after tooth formation is completed.

The use of fluoride tablets, however, is questionable as a feasible alternative to water fluoridation. The benefits are not as great, continued and persistent use is necessary (but not likely), and the cost-benefits are less favorable. Davies estimated the cost-benefits from a five-and-a-half-year study to be 1:1.7 from prescription fluoride-vitamin tablets and 1:0.7 from a two-year test of chewable fluoride tablets in school.

D. *Topical Fluorides*

Although varying degrees of caries inhibition are obtained from numerous topical agents and procedures, high fees in this country make the cost-benefits of professionally applied fluorides of doubtful or of marginal value unless integrated with a regular treatment program. When applied in a public health program, particular attention should be paid to the cost-benefit ratio.

E. *Fluoride Mouth Rinses*

Essentially topical fluoride also, there are now, however, considerations for self-application with supervision by nonprofessional personnel. Here the cost-benefits can be most favorable, if the procedure is reasonably effective in caries inhibition.

Commercial concerns are now actively promoting this type of self-application. One company suggests a weekly 60-second rinse with a 0.2% NaF solution at a low 25¢/year/child. Another procedure is to rinse with an APF solution which when swallowed delivers 1.0 mg F.

There are now numerous research reports of fluoride mouth-rinse studies in schools. They demonstrate not only the effectiveness of the procedure and agent used, but also the practicability of such a program in the schools.

It appears that frequency and perhaps concentration are more important than the particular agent used. The following studies are particularly significant:

Investigator	Method	Results
Torell	daily .05% NaF	50% reduction
(1965)	fortnightly 0.2% NaF	21% reduction
Swertloff & Shannon	0.1% SnF	31% reduction
(1965)	daily for 5 months	
Horowitz	weekly 0.2% NaF	grade 5-44% reduction
(1970)		grade 1-16% reduction
Radike	daily 0.1% SnF	40% DMFS
(1971)	fluoridated area	60% prox.
Assenden	.02% F as APF	30% reduction
(1972)	.02% F as NaF	27% reduction
	daily for 3 school years	
Frankl	.02% F as APF daily	12% reduction 1st year
(1972)		40% reduction 2nd year
Helfetz	weekly 0.3% F as NaF	37.5% reduction
	weekly 0.3% F as APF	27.4% reduction

F. *Preventive Dentistry — Toothkeeper Programs*

In 1972, Chambers presented a paper before this group explaining that the success of a preventive dentistry program is dependent on each individual's susceptibility to motivation to practice continued oral hygiene. He takes the pessimistic view that relatively few are susceptible to this motivation. There are now several reports of studies evaluating the *Toothkeeper* and other such programs and more are in progress. (The reader's attention is called to the Spring 1975 Issue of this *Journal*.—Ed.)

It appears that with the present population's susceptibility to oral hygiene motivation (or lack thereof), and with present methods of motivation, there is little hope of effecting a significant improvement in the public's dental health through this type of program. One may learn, however, from other technics and studies.

A more comprehensive type of school program has been suggested that not only includes plaque control, but also systemic and topical fluorides and dietary counseling. Certainly most are convinced that properly utilized, these methods in toto could largely eliminate the caries problem and probably largely control periodontal disease. However, one is faced with the low susceptibility to motivation that Chambers refers to both in school administrators and the population. Discouragement should not cause one to give up seeking better ways to motivate the public. One must remember, however, in planning programs, that one presently gets better cost-benefit ratios in programs that require a minimum of sustained effort from the public.

G. *Sealants*

Several studies have now shown that a bisphenol A-glycidyl methacrylate sealant when meticulously applied does a good job of sealing off pits and fissures and thereby prevents caries initiation while it is in place. The questions are: "Is this a practical public health measure? Can it be effectively applied on a mass basis in schools? With portable equipment? What is the cost-benefit ratio? Will sealing of 16 occlusals and connecting fissures out of 80 posterior surfaces result in a lasting benefit?"

At the IADR meeting last year, Pollard reported the results of a New York study in a fluoridated area in which almost 4500 teeth were sealed. After one year, compared to the control teeth, 276 fewer carious sites occurred — 6.2 percent of the total sites sealed. In other words, 16 sites were sealed to save one from decay.

Horowitz reported on a Montana study that 67 percent of occusal carious lesions were prevented after two years and 73 percent of the treated surfaces showed full retention of the sealant.

Going in Florida reported 77 percent full retention after 12 months. Of treated teeth, 11 percent became carious, and of control teeth, 29 percent. In this study, after 12 months, five-and-a-half sites were sealed to prevent one from becoming carious.

At present, the exacting, moisture-free technic of application and the low cost-benefit ratio of the procedure contraindicate a recommendation for mass public health sealant programs. However, more studies are in progress. Technics and materials are improving. Sealants may yet find a place in public health practice.

In summary, it appears that after fluoridation and school fluoridation, and with present-day evidence, the public health dentist can get the most from his caries-prevention dollar by initiation of fluoride-mouth-rinse programs in schools that can be maintained and supervised without the use of professional dental or hygienist personnel.

J. David Suomi
Richard C. Graves
John K. Peterson, Chairman

APPENDIX 5

The 1977 SDDA Survey of Dentists: A Linkage Report

The South Dakota Dental Association has been active in recent years in creating programs to alleviate dental problems in South Dakota. However, some of the data required to evaluate these programs and to get direction from all South Dakota dentists was not available. It became clear in the spring of 1977 that additional data would also be needed by the Linkage Project in order to prepare the assessment of adequacy of the numbers of dentists in South Dakota. As a result the 2 groups joined forces to conduct such a survey.

The questionnaire was developed during March and April of 1977 and reviewed and tested during April. It was mailed on May 9, 1977 to 276 South Dakota dentists. Nine of these were discovered to be out-of-state or no longer licensed, leaving 267. One mail follow-up and one telephone follow-up were used. By July 27, 1977 243 were returned for a response rate of 91%. Since some information was known on the 24 non-respondents, the response rate was actually better than 91%. There were 8 dentists who were retired or not seeing patients and there were 2 from group practices in which the productivity of the practices was known. Therefore the usable response rate was 245/259 = 95%. A copy of the cover letter and survey instrument is attached.

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South Dakota Dental Association

A constituent society of the American Dental Association

Box 1194
Pierre, South Dakota 57501
Phone (605) 224-5012

Mike Shaw
Administrative Director

Eldon J. Deadrick, D.D.S.
Chairman
Council on Dental Healt

May 9, 1977

Dear South Dakota Dentists:

The South Dakota Dental Association has and continues to be actively involved with the planning for Dental Manpower in South Dakota. The Association has helped establish Compact and Loan Forgiveness Programs for dental students as well as placement services for all members of the dental team.

The Districts as well as the State Association are frequently asked to participate in National Health Service Corps designations.

The Associations' Council on Dental Health and Dr. Dunn, Association Secretary, are currently working with the Dental Subcommittee of the Health Manpower Planning and Linkage Project in a comprehensive study of Dentistry in the state.

Therefore, you can see that the Association has many needs for accurate data and opinions from all South Dakota Dentists. I urge each of you to take a few minutes of your time to accurately complete the enclosed questionnaire. The results will be compiled by the Linkage Project and jointly analyzed by the Linkage Dental Committee and the Council on Dental Health. A report of the summarized results will be mailed to you. A self-addressed stamped envelope is provided for return of your completed questionnaire. Please return the questionnaire by June 1. Thank you.

Sincerely,

DR. R. J. SCHOESSLER
President
South Dakota Dental Association

RJS:smb
Enclosures

Please answer the following questions using your records and/or your best judgment.

A. Are you in private practice? (check one)

1 [ ] Yes
2 [ ] No, retired
3 [ ] No, (specify)_____

If your answer was No (not in private practice), go to question P.

B. Do you feel you are (check one)

1 [ ]..too busy to treat everyone requesting appointments
2 [ ]..providing dental care for the vast majority of those who request appointments, but am overworked
3 [ ]..about right - enough patients, but not overworked
4 [ ]..not busy enough and would like more patients

C. Do you accept new patients? (check one)

1 [ ] No (go to question E.)
2 [ ] Yes

D. How soon could you appoint a new patient (non-emergency) for examination and treatment? _____Week(s)

E. Type of Practice (check one)

1 [ ] Solo (go to question F)
2 [ ] Self-employed, but share costs of office, assistants, etc. (without dividing income on a percentage basis) (see note below)

3 [ ] Self-employed as a partner in a complete partnership (both income and expenses shared (see note below)
Number of dentists in the partnership including yourself_____

4 [ ] Self-employed and employ at least one other dentist
How many do you employ? _____ (see note below)

5 [ ] Employed by another dentist or by an incorporated practice (see note below)

Note: If you checked anything but Number 1, Solo, questions F through O below apply to the total practice and therefore only one dentist need fill this part out. Please list the names of all dentists that work together and only one of you fill out questions F through O.

_____

_____

_____

_____

F. Specialty

1 [ ] General Practice
2 [ ] Practice Limited to Oral Surgery
3 [ ] Practice Limited to Orthodontics
4 [ ] Practice Limited to Pedodontics
5 [ ] Practice Limited to Periodontics
6 [ ] Practice Limited to Prosthodontics
7 [ ] Practice Limited to Endodontics
8 [ ] Practice Limited to Oral Pathology

G. Do you maintain more than one practice location?

1 [ ] No: Address _____
City _____

2 [ ] Yes: Primary Address _____
City _____

Secondary Address _____
City _____

Note: If you maintain more than one office, please put two numbers in questions H through O. List the primary office first and the secondary office second.

H. How many weeks during 1976 did you treat patients? _____ Weeks

I. During a typical week, how many patient settings (patient visits) do you and your hygienist have in total? _____ patient visits

J. During the typical week in question I, how many of these visits did your hygienist see? _____ patient visits

K. Please list below the number of persons employed by you

Category	Number Employed Today	Number of Persons Who Work			
		35 hrs per week	20-34 hrs per week	10-19 hrs per week	1-9 hrs per week
1. Receptionist/Secretary *					
2. Chairside Assistant Not Certified *					
3. Certified Dental Assistant **					
4. Hygienist					
5. Laboratory Technician					
6. Other (please specify)					

*If an employee is a Receptionist/Secretary and a Chairside Assistant, please record as a Chairside Assistant.
** Please put all CDA's here regardless of duties.

L. If they were available to you now, how many of the following would you hire?

Full-time certified dental assistant_____
Part-time certified dental assistant_____
Full-time hygienist _____
Part-time hygienist _____

M. On the enclosed map outline the area where 80 percent of your patients live.

N. Do you think that this area you have outlined has (check one)

1 [ ] Too many dentists
2 [ ] Sufficient number of dentists
3 [ ] Too few dentists
4 [ ] Don't know

O. Rank the five most important factors you used in answering question N above (1 is the most important factor and 5 is the least important)

[ ] Dentist/population ratio
[ ] Time to appoint new patients
[ ] Distance traveled
[ ] Workload of existing dentists
[ ] Age of existing dentists
[ ] (Specify)_____
[ ] (Specify)_____
[ ] (Specify)_____

P. Public funds are used in South Dakota to provide educational opportunity for 70 dental students from our state. Do you think this is (check one)

1 [ ] Too many
2 [ ] Sufficient
3 [ ] Not enough

Q. Date of Birth: Month_____ Year_____

R. Dental school attended:_____ Year graduated:_____

S. Your Name _____

T. Additional Comments to South Dakota Dental Association and Planners that you would like to make. (Use the back if needed)

_____

_____

_____

_____

_____

Please return the Questionnaire in the enclosed self-addressed stamped envelope.

Thank you.

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SOUTH DAKOTA COUNTY SEAT LISTING

SOUTH DAKOTA